



A framework for the construction of knowledge within eLearning

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis/project is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

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Dedication

For my husband, Rolf and daughter Amelia for their undying love and support, without which this thesis would not have come to fruition. I also thank all my family and friends for their continuous encouragement. For instructional designers everywhere, the unsung heroes toiling behind the scenes to create environments where learning takes place.

Education is not preparation for life: education is life itself. John Dewey.

Publications

The following papers were written as part of the research for this thesis:

Axmann, M. & McKay, E. (2011). An exploration of instructional principles for the human-dimensions of Human-Computer Interaction within a web-mediated higher education setting. *Global Learn, Asia-Pacific* 28 March – 1 April 2011, Melbourne, Australia.

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GLOSSARY OF TERMS

Term	Description
Asynchronous communication method	Asynchronous communication does not require all parties involved in the communication to be present at the same time. Some examples are email messages, discussion boards, blogging, and text messaging over mobile phones. In distance (specifically online) education, asynchronous communication is the major (sometimes the only) method of communication (Jones, 2007). Refer also to synchronous communication.
Authentic assessment	An assessment presenting tasks that reflect the kind of mastery demonstrated by experts. Authentic assessment of a student's ability to solve problems, for example, would assess how effectively a student solves a real problem (Herrington, Reeves, & Oliver, 2010).
Behaviourism	A theory suggesting that learning occurs when an environmental stimulus triggers response or behaviour. Based on classical conditioning theory, behaviourism applies to educational practices that reward performance behaviours to encourage repetition of those behaviours. Rote memorisation and drill-and-practice instruction are supported by behaviourist theory (Skinner, 1968).
Benchmark	A statement that provides a description of student knowledge expected at specific grades, ages, or developmental levels. Benchmarks often are used in conjunction with standards (Arshavskiy, 2013).
Blended learning	A formal education program in which a student learns at least in part through delivery of content and instruction via digital and online media with some element of student control over time, place, path, or pace (Badcock, Pattison, & Harris, 2010).
Blog	A web page that serves as a publicly accessible personal journal for an individual. Typically updated daily, blogs often reflect the personality of the author (Allen, 2003).
Cognitive science	A science investigating how people learn rather than what they learn. Prior knowledge and out-of-classroom experience help form the foundation on which teachers build effective instruction. Also referred to as the study of the mind (Gagne & Merrill, 1990).
Collaborative learning or cooperative learning	An instructional approach in which students of varying abilities and interests work together in small groups to solve a problem, complete a project, or achieve a common goal (Barnes, 2012).

Constructivism	A theory suggesting that students learn by constructing their own knowledge, especially through hands-on exploration. It emphasises that the context in which an idea is presented, as well as student attitude and behaviour, affects learning. Students learn by incorporating new information into what they already know (J. Biggs, 2003).
Course Management System (CMS) (also known as a Learning Management System — LMS)	Software that automates the administration of a class website. It often includes modules for online class discussions, grade books, homework turn-in and pickup, class calendars, and tools to make it easy to upload documents and link to electronic course reserves (Clark & Mayer, 2008).
Critical thinking	Logical thinking that draws conclusions from facts and evidence (J. Bradley, 2010).
Discussion boards	Forums on the internet or an intranet where users can post messages for others to read (Chen, Pedersen, & Murphy, 2011).
Distance education	Using technology to support the learning process in different locations (Chew, Jones, & Turner, 2008).
Educational design	The process of identifying the skills, knowledge, information and attitude gaps of a targeted audience and creating, selecting or suggesting learning experiences that close this gap, based on instructional theory and best practices from the field (Bean, 2014).
eLearning (electronic learning)	A term covering a wide set of applications and processes, such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via internet, intranet/extranet (LAN/WAN), audio- and videotape, satellite broadcast, interactive TV, CD-ROM, and more. For the purpose of this study, the following definition is accepted: eLearning is an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction that facilitates the adoption of new ways of understanding and developing learning (Sangrà, Vlachopoulos, & Cabrera, 2012).
Emerging technology	A new technology that is currently being developed, or will be developed within the next five to ten years (Williams, Karousou, & Mackness, 2011).
Face-to-face delivery	Any form of instructional interaction that occurs ‘in person’ and in real time between educators and students (C. White, Ramirez, Smith, & Plonowski, 2010).

Facilitator	A role for teachers that allows students to take a more active role in learning. Teachers assist students in making connections between classroom instruction and the students' own knowledge and experiences by encouraging students to create new solutions, by challenging their assumptions, and by asking probing questions (Barton, Corbitt, & Nguyen, 2009).
Formative assessment	The purpose of the formative assessment is to monitor and guide the students through a process while it is still in progress rather than assessing the students when the project is complete. The formative assessment is basically a form of informal observation where the teacher can make decisions regarding specific problems with the instruction and determine how well students are responding to the instruction (compare to summative assessment) (J. Biggs, 2003).
Human-computer interaction (HCI)	A discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them (Proctor & Kim-Phuong, 2008).
Hands-on/minds-on activities	Activities that engage students' physical as well as mental skills to solve problems. Students devise a solution strategy, predict outcomes, activate or perform the strategy, reflect on the results, and compare the end results with their predictions (Oreilly, Lefoe, Philip, & Parrish, 2010).
Higher-order thinking skills	Understanding complex concepts and applying sometimes conflicting information to solve a problem, which may have more than one correct answer (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956).
Informal knowledge	Knowledge about a topic that students learn through experience outside of the classroom (Gârlășu, Dumitrache, & Stănescu, 2005).
Instructional design	The genre that deals with instruction and the presentation of information to facilitate and maximise the learning process (Merrill, Barclay, & Van Schaak, 2008, p. 173).
Instructional technology	A field concerned with improving the efficiency and effectiveness of instruction, involving designing instruction (including all the phases of activity from needs assessment to evaluation) and applying learning theory to instructional design (Clark & Mayer, 2008).
Learner-centred classroom	A classroom in which students are encouraged to choose their own learning goals and projects. This approach is based on the belief that students have a natural inclination to learn, learn better when they work on real or authentic tasks, benefit from interacting with diverse groups of people, and learn best when teachers understand and value the difference in how each student learns (Cheung & Vogel, 2013)
Learning design	Learning design focuses on the teaching-learning process that happens

	in a lesson, a unit of learning or a course (Reigeluth, 2009).
Learning Management System (LMS)	Software that automates the administration of a class website. It often includes modules for online class discussions, grade books, homework turn-in and pickup, class calendars, and tools to make it easy to upload documents and link to electronic course reserves (Majeski, Stover, & Ronch, 2015).
Learning platforms	Internal or external sites often organised around tightly focused topics. These sites contain technologies (ranging from chat rooms to groupware) that enable users to submit and retrieve information (Rennie & Morrison, 2013).
Learning portal	Any website that offers learners or organisations consolidated access to learning and training resources from multiple sources. Operators of learning portals are also called content aggregators, distributors, or hosts (Francisco, 2013).
Meta-cognition	The process of considering and regulating one's own learning. Activities include assessing or reviewing one's current and previous knowledge, identifying gaps in that knowledge, planning gap-filling strategies, determining the relevance of new information, and potentially revising beliefs on the subject (Schwonke, 2015).
Mobile learning (m-learning)	Learning across multiple contexts, through social and content interactions, using personal electronic or mobile devices (Henderson, Selwyn, & Aston, 2015).
Multimedia	A term that encompasses interactive text, images, sound, and colour. Multimedia can be anything from a simple PowerPoint slideshow to a complex interactive simulation (C. Moore & Signor, 2014).
Online	The state in which a computer is connected to another computer or server via a network. A computer communicating with another computer (Harris, 2010).
Online community	A meeting place on the internet for people who share common interests and needs. Online communities can be open to all or be limited to membership only and may or may not be moderated (Mavroudi, Hadzilacos, Kalles, & Gregoriades, 2015).
Online learning	Learning delivered by web-based or internet-based technologies. Also referred to as web-based training and internet-based training (Harris, 2010).
Problem-based or inquiry learning	A process in which students investigate a problem, devise and work through a plan to solve the problem, and propose a solution to the problem (Reigeluth, 2009).
Real-time communication	Communication in which information is received at (or nearly at) the instant it is sent. Real-time communication is a characteristic of

	synchronous learning (Kehrwald, 2008).
Social constructivism	Social constructivism recognises that knowledge is constructed through social interaction and is a shared rather than an individual experience (Vygotsky, 1978).
Social media	The collective of online communications channels dedicated to community-based input, interaction, content sharing and collaboration. Websites and applications dedicated to forums, micro-blogging, social networking, social bookmarking, social curation, and wikis are among the different types of social media (Cope & Kalantzis, 2013).
Social network	A set of nodes (e.g. persons, organisations) linked by a set of social relationships (e.g. friendship, transfer of funds, overlapping membership) of a specified type (Noharia & Eccles, 1992, p. 4).
Summative assessment	Summative assessment is usually administered at the end of a unit of instruction and is used as a formal assessment of the task given to students. It includes graded tests, worksheets and projects. Summative assessments are given less frequently than formative assessments; they are, however, an important means for the teacher to judge the overall effectiveness of a learning activity (Boyle & Ravenscroft, 2012).
Synchronous communication method	Direct communication where the communicators are time synchronised. This means that all parties involved in the communication are present at the same time. This includes, but is not limited to, a telephone conversation (not texting), a company board meeting, a chat room event and instant messaging (Jones, 2007).
Synchronous learning	A real-time, instructor-led online learning event in which all respondents are logged on at the same time and communicate directly with each other. In most platforms, students and teachers can use a whiteboard to see work in progress and share knowledge. Interaction may also occur via audio- or video-conferencing, internet telephony, or two-way live broadcasts (Ellis, Jarkey, Mahony, Peat, & Sheely, 2007).
User-interface design (UI)	Everything designed into an information device with which a human being may interact (Nielsen, 1993).
User-friendliness	Easy to learn, ease of use, easy to understand, or easy to deal with (Norman & Draper, 1986).
User-experience	The overall experience of a person using a product such as a website or computer application, especially in terms of how easy or pleasing it is to use (Norman, 2004).

Video-conferencing	Conducting a conference between two or more respondents at different sites by using the internet to transmit audio. For example, a point-to-point (two-person) video-conference works much like a video telephone. Video-conferencing involves using video and audio signals to link respondents at different and remote locations (O'Donnel, Mulwa, Sharp, & Wade, 2013).
Virtual classroom	An artificial computer-generated environment that is experienced through sensory stimuli and in which special equipment allows the user to interact with the simulation (Oreilly et al., 2010).
Web 2.0	The second stage of development of the internet, characterised especially by the change from static web pages to dynamic or user-generated content and the growth of social media (Waycott & Gray, 2011).

A FRAMEWORK FOR CO-CONSTRUCTION OF KNOWLEDGE WITHIN ELEARNING

ABSTRACT

Instructional designers, course developers and academics require ways to create eLearning courses rapidly and support learners to be engaged with authentic learning tasks. Social media tools within eLearning courses are in the discovery phase and rely heavily on social constructivist design that includes meta-cognition, collaborative learning, active knowledge-making and recursive feedback. Emergent models and frameworks that allow for optimisation of social networking and the co-construction of knowledge are required for sound eLearning design.

This research study investigates the effectiveness of learning design elements and identifies components informed by a constructivist instructional design (C-ID) approach. The study explores how learning design elements that facilitates the co-construction of knowledge can be implemented within a framework applicable to the Australian eLearning higher education context. Pragmatism as a research paradigm views knowledge as constructed and based on the reality of the world one experiences and lives in, and aligns with a social constructivist approach. Following on from a pragmatic viewpoint, this study selected exploratory sequential design within a mixed methods approach as it enables both narrative data collection and numerical analysis.

A group of subject-matter experts from Australian higher education institutions were purposefully invited to participate in an eDelphi expert panel. A total of 53 ($n = 53$) instructional designers and academics that adhered to the selection criteria were contacted by means of email. Seventeen (17) respondents agreed to the study, resulting in a response rate of 32%. Qualitative data sets of semi-structured interviews with respondents were analysed to determine emergent themes and topics.

An electronic questionnaire was administered to a larger sample. The survey was sent out to 434 prospective respondents, of which 143 started the survey and $n = 113$ respondents completed all Likert scale questions in the survey. The Wilcoxon rank-sum test and Kruskal–Wallis process were applied to investigate if the perception of respondents was different depending on variables identified for the research.

Complex, multi-layered eLearning modalities are a new field within instructional design, and there are minimal empirical studies for instructional designers and course developers to find shared meaning of critical learning design elements. The results from the study indicated that learning design elements associated with constructivist concepts such as social learning presence, learning interaction, meta-cognitive load, knowledge-sharing space and knowledge construction are conducive to social networking and the co-construction of knowledge. The categories emerging from coding of the data sets were learning activities and interactivities, social communication, collaboration, diversity, fears and the student-lecturer relationship. These categories need to be considered when designing for social learning interaction as they are aimed at addressing human interaction with technology. Relationships surrounding activities therefore need to be taken into account when designing the learning activities, and not merely the learning content and outcomes.

The instructional guidelines considered most important when designing for online social interaction were authentic, meaningful and relevant instruction; conscious modelling of behaviour; rules for engagement; user-centred design; and spontaneous design. Establishing a strong social learning presence fosters the building of trust and opportunities to create social learning experiences critical for social networking.

The eLearning framework presented by this study underpins a shared meaning, categories and recommended learning activities that can be utilised by instructional designers, academics and course developers when creating multi-layered complex online learning spaces.

CHAPTER 1 INTRODUCTION

At its best, eLearning is as good as the best classroom learning. At its worst, it is as bad as the worst classroom learning. The difference is design. (Horton, 2006, p. 3)

1.1 Background to the study

1.1.1 eLearning and social networking

Modern instructional systems are aimed at creating supportive electronic learning spaces that include social networking and co-creation of new knowledge, as opposed to traditional paper-based materials (Palmer & Holt, 2014). Social networking has the potential to play an enormous positive role in enhancing the student experience, for example, by providing learner support, peer-to-peer interaction and educational 'play-spaces' (Rennie & Morrison, 2013).

Students have come to expect the same interpersonal interactions and social cues they experience on-campus when participating in an online learning activity (Slagter Van Tyron & Bishop, 2009; Wise, Padmanabham, & Duffy, 2009). The ways that students construct knowledge in a collaborative setting are informed by the social constructivist approach to learning (Almala, 2006) and this contributes to the learning being internalised as opposed to rote learning and memorisation. A social network can be described as a set of nodes (e.g. persons, organisations) linked by a set of social relationships (e.g. friendship, group membership, shared interest) of a specified type (Noharia & Eccles, 1992, p. 4). The application of social networking technologies in the online environment draws the focus of this research on the intersection between education, learning and teaching within information and computer technologies (ICT).

1.1.2 Definition of eLearning for the purpose of this study

Electronic learning (henceforth referred to as eLearning) can be argued to be a natural extension of disciplines such as instructional design and distance education. In recent years mobile technologies (e.g. tablets, mobile phones, smartphones, iPads) have become increasingly popular devices and are now also used to access the online learning modality (Strong, Irby, Wynn, & McClure, 2012). eLearning is not restricted to distance education, and takes on various modes, such as blended learning, hybrid learning or mixed-mode education. This means that face-to-face (classroom) interaction can be blended with asynchronous (not real-time) and synchronous (real-time) methods of computer-mediated communication (Wise et al., 2009). Sangrà et al. (2012) postulated an extended definition of eLearning as an approach to teaching and learning that applies educational models based on the use of electronic media and devices to access online educational environments, namely:

‘eLearning ... is based on the use of electronic media and devices as tools for improving access to training, communication and interaction that facilitates the adoption of new ways of understanding and developing learning’ (Sangrà et al., 2012).

Despite the exponential growth of eLearning course offerings and this promise of anywhere, anyhow and anytime learning, students continue to report feelings of social disconnectedness (Limniou & Smith, 2010). In order for students to achieve a sense of connection, they need to establish social learning presence, referring to their ability to project themselves socially and affectively into a learning community.

1.1.3 eLearning and instructional design within the context of this study

The literature supports differing uses of the term 'eLearning'. For the purpose of this study, learning design elements that occur within the boundaries of institutional learning management systems (LMSs) and assessments facilitated by academics of particular university infrastructure within the Australian context are considered. eLearning presents all kinds of challenges within Australian higher education. Educators and students often have to deal with information overload, and they need to keep pace with understanding the ever-changing technologies in education, which often places end-users on a steep learning curve (Chen et al., 2011).

Academics and course developers need to integrate the use of emerging technologies with learning design. All stakeholders in the learning process need to act as end-users and know how to use the emerging technologies effectively (Tucker & Gentry, 2009). eLearning attrition and retention rates are often lower than those of face-to-face instruction, and student engagement seems to play a role with student drop-out statistics (Henderson et al., 2015). This study investigates the ways in which social networking and the co-construction of knowledge can be facilitated within the eLearning environment to further promote student engagement as a recognised aspect of student retention.

Horton (2006) cautions that 'design' is not the same as development. Design is a decision that governs what we plan to do, and involves judgement, compromise, trade-off and creativity (Palmer & Holt, 2012). For the purpose of this research study, 'instructional design' is seen as the genre that deals with the instruction and presentation of information 'to facilitate and maximise the learning process' (Merrill et al., 2008, p. 173).

The terms 'instructional design', 'educational design', 'instructional technology', and more recently 'learning design' overlap and are sometimes used interchangeably. The use of a variety of terms to denote the design activities often creates confusion as to what is meant when referring to the role of the instructional designer (Limniou & Smith, 2010). Instructional design methodology can be used by a variety of eLearning practitioners (academics, instructional designers, multimedia designers, course developers, etc.) and is not restricted to the instructional designer.

1.1.4 Constructivist instructional design

Constructivist educators view learning as an active process in which learners create new ideas and connections through the reconstruction of experiences (Von Glaserfeld, 1993). Therefore, when engaging in activities online, learners ought to be active and then be given the opportunity to reflect on what they have learnt. Constructivist instructional design is aimed at constructing eLearning environments in such a way that optimal learning, including generic skills development, may take place (Dick & Carey, 2006; Ellis et al., 2007; Merrill et al., 2008). Collaboration with other learners is therefore essential to create knowledge in the first instance. Individual reflection should be followed up with social networking to check the student's learning progress (Kirschner, Sweller, & Clark, 2006).

1.1.5 Knowledge construction and online learning design

The design of online learning activities and social interactions often incorporates technologically supported delivery that enables online discussions using tools such as wikis and blogs (Waycott & Gray, 2011). Delivery modes using emerging technologies are not always incorporated in a mindful way from the outset of the eLearning course or module design (Henderson et al., 2015; Majeski et al., 2015). Learners ought to construct their own knowledge rather than accepting what is delivered and disseminated by the instructor (Jonassen, 2005). Knowledge construction is facilitated by good interactive online instruction since students complete activities that ensure they have to take the initiative to learn and to interact with other students and the instructor (O'Donnel et al., 2013).

It is not a given that the eLearning practitioner would discern which critical learning design elements promote both online social interaction and joint knowledge construction (Henderson et al., 2015). Although many facets of constructivist design are established, it is not always obvious how learning design elements could be designed within eLearning to support both a constructivist design approach and the use of technology to enable online interaction, hence the investigation of this study.

1.2 Justification for the study

Human-centred design approaches such as scenario-based, participatory, and global and intercultural design paved the way for constructivist instructional design approaches (Könings, Brand-Gruwel, & Merriënboer, 2010). Constructivist design relies on interpretive and experiential learning as opposed to step-by-step instruction as prescribed by traditional instructional models (Willis, 2009a).

Instructional designers and academic course developers require a framework to assist them to design eLearning courses that fully utilise new applications for social networking, especially as many of the social media tools are still in the discovery phase (Rennie & Morrison, 2013). Emergent models for eLearning show the importance of meta-cognition, collaborative learning, active knowledge-making and recursive feedback as essential components of course design (Cope & Kalantzis, 2013). However, Bradley (2010) observes that when designing a constructivist learning environment, ‘there are no established standards and measurable outcomes, to provide a framework for the instructional designer’ (p. 22).

Therefore, despite it being recognised that learning design elements such as meta-cognition, collaborative and social learning are critical components, it is not always clear how these elements may be designed when more than one form of interaction (such as a combination of wikis, blogs and discussion forums) is utilised to support learning (Waycott, Sheard, Thompson, & Clerehan, 2013). Standardised lectures and discussions that are heavily pre-designed may not always provide opportunities for students to explore real-life problems, which are imperative for sense-making and knowledge construction (Waycott & Gray, 2011). Learners need to be engaged in realistic tasks that provide opportunities for collaborative activities for authentic learning to occur, such as conducting a real-world survey or researching local history (Herrington et al., 2010).

An understanding of critical learning design elements for the effective use of emerging technologies to promote social networking for the co-construction of knowledge and associated learning performance assessment is key as a tool for eLearning practitioners

(Harris, 2010). This research study contributes by presenting an instructional framework that assists with developing learner interaction within a complex eLearning environment.

1.3 Research aim and objectives

The **general aim** of the research study is to investigate learning design elements for an eLearning framework that promote the use of emerging technologies for social networking and co-construction of knowledge. The instructional design under consideration is informed by a constructivist instructional design approach. The research aims to examine the effective use of online learning elements that can contribute towards a framework to optimise learning within the Australian eLearning higher education context.

The **main objectives** of the research study are as follows:

- Investigate the critical learning design elements for online collaborative learning that are informed by a constructivist instructional design approach.
- Validate the effectiveness of learning design elements for the co-construction of knowledge against the perceptions of eLearning practitioners in the field of Australian higher education.

The **central research questions** that steer the research study are as follows:

- What are the critical learning design elements for the co-construction of knowledge within eLearning that are informed by a constructivist instructional design approach?
- How can the effectiveness of the learning design elements to support social networking and co-construction of knowledge be gauged, in terms of learning

performance effectiveness, in order to create a framework for optimised eLearning within the Australian eLearning higher education context?

1.4 Methodology

This study selected exploratory sequential design within a mixed methods approach, as it enables both narrative data collection and numerical analysis to explore the components related to the proposed eLearning framework (Cresswell & Plano-Clark, 2011, p. 69). The data collection techniques (namely the eDelphi expert panel and semi-structured interviews) of the qualitative strand emerge and are dependent on the next quantitative strand (namely the electronic survey), which leads up to an interpretation of the data (Krathwohl, 2004). Pragmatism as a research paradigm was applied as best match for the research problem in order to make the study manageable. Pragmatism views knowledge as constructed and based on the reality of the world one experiences and lives in, and this concept aligns with social constructivism (Teddlie & Tashakkori, 2009). A group of subject-matter experts from Australian higher education institutions were purposefully invited to participate in an eDelphi expert panel. The panel members provided ratings and contributed to the identification of learning design elements that are critical when designing a constructivist eLearning environment that supports social networking and co-authorship.

The researcher developed an electronic survey for a larger number of the sample population in which the identified categories of learning elements were considered in terms of effectiveness, thus being treated as variables (Cresswell & Plano-Clark, 2011, p. 71). The electronic survey contained questions concerning the following aspects:

- Importance of facilitation tasks;
- Online facilitation tasks employed;
- Effective advice for online facilitation;

- Effective activities for online facilitation;
- Importance of facilitation tasks in motivating and encouraging students to work collaboratively;
- Preferable activities for students in the classroom; and
- The importance of organisational support.

For each relevant learning design element item, a Wilcoxon rank-sum test and Kruskal–Wallis test (Hollander & Wolfe, 1999) were performed to investigate if the perception of respondents was different depending on whether they were:

- Educated to different levels (Kruskal–Wallis test);
- Instructional designers for a different number of years (Kruskal–Wallis test); and
- Operating as instructional designers in Victoria (Wilcoxon rank-sum test).

The application of the Wilcoxon rank-sum test and Kruskal–Wallis process served to further highlight any differences in the backgrounds and profiles of respondents that may have influenced their perceptions of requisite learning design elements and their relative effectiveness for purpose.

1.5 Main contribution of the study

The main contribution of the study is an eLearning framework that instructional designers, course developers, academics and other eLearning practitioners can utilise when designing for social networking and co-construction of knowledge. The main findings of the study offer a shared meaning, criteria and recommended eLearning activities for each of the learning design elements within the framework that can be utilised by instructional designers, academics and course developers when creating complex eLearning environments.

1.6 Organisation of the thesis

The presentation of the research study is organised into chapters as outlined below.

Chapter 2: eLearning and constructivist instructional design provides an overview of the pertinent literature for the study, namely eLearning, instructional design within the field of eLearning, and prominent instructional design models are highlighted. Issues such as human-centred design and the creation of constructivist learning environments are discussed. This chapter also presents social constructivism as a theoretical framework for the study and highlights that the existing theory related to the five selected learning design elements, namely (i) social learning presence; (ii) social learning interaction; (iii) meta-cognitive load; (iv) knowledge-sharing space; and (v) knowledge construction.

Chapter 3: Methodology details the research methodology for the study. Pragmatism as a research paradigm and exploratory sequential research design are applied to this study. Justification for the selected methodology is provided, and the research design, aim and techniques are set out. The data analysis techniques and data collection, namely an eDelphi expert panel, semi-structured interviews and electronic survey, are presented.

Chapter 4: Identify learning design elements for social networking and co-construction of knowledge presents the qualitative analysis of the eDelphi expert panel. This chapter also discusses the findings derived from the panel of experts and a comparison with the literature.

Chapter 5: Further exploration of learning design elements presents the qualitative analysis of the semi-structured interviews. This chapter also discusses the findings from the interviews.

Chapter 6: Validate and refine learning design elements reports the electronic survey analysis and findings that were distributed to course developers and academics facilitating within an online environment.

Chapter 7: Framework for social networking and co-construction of knowledge within eLearning deliberates the framework as suggested by the findings from the research project. The research enabled the development of an online and blended learning framework for social networking collaborative co-authorship to generate new knowledge. The research posits the use of the specified learning design elements to enable a positive learning experience with a focus on the use of social interaction supported by emerging technologies.

Chapter 8: Conclusions and future work summarises the findings, academic contributions of the study and future work.

CHAPTER 2 ELEARNING AND CONSTRUCTIVIST INSTRUCTIONAL DESIGN

A mind that is stretched by a new experience can never go back to its original dimensions. Oliver Wendell Holmes Jr.

2.1 Introduction

The background to the study (Chapter 1) noted that students continue to report feelings of social disconnectedness and that this may adversely affect attrition and retention rates in eLearning. The literature review (Chapter 2) investigates emerging trends within the field of eLearning and instructional design to determine how practitioners are currently dealing with these issues. In attempting to understand how student engagement can be promoted in online learning by creating interaction that includes collaboration, reflection and generic skills development, it is important to firstly gain insight into the changing face of eLearning. The inclusions of collaborative and social media online tools are rapidly changing the presentation of online learning programs. The first section of this chapter discusses how these fundamental changes are impacting on how students are interacting with technology on a personal and global scale.

The second section of this chapter reviews how the emergent trends in instructional strategies support social networking and co-construction of knowledge within online learning design. The contribution of learning theories to instructional eLearning programs, the design of social interaction, higher-order thinking skills and the active construction of knowledge are considered.

This study is situated within Australian higher education and therefore attention was paid to the body of literature that pertains to the current developments and issues facing that sector. The learning theories, as discussed in this chapter, evolved from behaviourism as the first systematic study of behaviour to cognitive learning theories and modern-day social constructivism. Social constructivism declares that knowledge is acquired through collaboration with meaning negotiated from multiple perspectives and is in alignment with the purpose of social networking and co-construction of knowledge.

Instructional design models such as ADDIE, the Dick and Carey Systems Approach, the Rapid ISD model, and the Successive Approximation Model (SAM) focus on the design, development and evaluation phases of eLearning projects. However, these models describe the instructional design process used to create a learning product, and do not provide guidelines on how the social learning interaction within the space could be structured.

The emergent models, such as eLearning ecologies, derive that the learner is an active contributor towards the learning process instead of a passive receiver of information. However, instructional designers and course developers do not always have a shared meaning or consensus on the implementation of these processes in higher education academic practice. Emergent models of eLearning and social constructivism refer to the educational processes, such as active knowledge-making and meta-cognition, and serve as the point of departure for the eLearning framework that is the aim of this study.

2.2 The changing face of eLearning

The introduction of the World Wide Web, also known as Web 1.0, during the late 1980s popularised the delivery of eLearning and irrefutably changed the face of distance education and the traditional classroom (J. L. Moore, Dickson-Deane, & Galyen, 2011). White (2013) remarks that prior to the term eLearning, terms such as computer-assisted learning and/or training and computer-based learning and/or training were used.

Web 2.0 and social media

The introduction of collaborative environments and social media, known as Web 2.0, added yet another level of sophistication to learning design elements available in online and blended learning environments (Oreilly et al., 2010). Courses delivered in online environments were often supported by social constructivist thinking and a focus on collaboration (Pitman, 2013).

Open-access and online collaboration

Web 2.0 technologies enable students to publish and share content in forums hosted within or outside their university's infrastructure. Open access to information and online collaboration across geographical areas enables co-authoring of information. Academic integrity including issues of authorship, ownership, attribution and acknowledgement can be disputed (Waycott, Bennett, Kennedy, Dalgarno, & Gray, 2010). It is no longer a simple choice between deciding what is desirable and what is reprehensible (Sellen, Rogers, Harper, & Rodden, 2009). eLearning practitioners need to be astutely aware of how one set of design choices may highlight certain values and exchanges at the expense of others when interacting with the technology (Oreilly et al., 2010).

Humans interacting with technology

We learn from each other by sharing our experiences, bouncing ideas off each other and working through problems, which is also the premise of social constructivism (Bean, 2014).

The following fundamental changes are impacting on how students are interacting with technology on a personal and global scale.

- **End of interface stability:** Computers are no longer defined by a single interface, but rather by many different interfaces, or none at all. They are embedded in everyday objects such as home appliances, cars, books and toys. Developments in user-interface challenge the notion of locus of control of human-machine interaction as it can no longer be simply depicted by a keyboard and monitor (Sellen, Rogers, Harper, & Rodden, 2009). In the past, learning design elements made available as a dictate of instructional design were confined within a CD-ROM or stand-alone PC interfaces, whereas nowadays students may use any number of appliances to access their learning materials. This calls for a more fluid approach to design than the step-by-step product development models of the last century.
- **Advancement of techno-dependence:** Dependency on technological infrastructure increases and underpins most aspects of our lives, including work, travel and leisure. Computer technologies are more autonomous and sophisticated, and also reliant on each other in complex networks. Networked learning and the exponential growth of knowledge are changing the way we deal with information and also our views about knowledge (Downes, 2012).

- **Growth of hyper-connectivity:** Communication technologies are becoming more influential, and 'digital presence' consumes more time. Increased connectivity has given rise to the creation and mobilisation of global communities, digital footprints and creative outputs.
- **Mobile learning:** Digital devices connected in a mobile environment embrace the notion of easy-to-access and mobile technologies that support learning (Cochrane, 2008). Published findings from a study that surveyed first-year students at an Australian university (Oliver & Gourke, 2007) found that a high proportion of students reported that they had access to the internet outside university and frequently used online resources for study purposes (93% and 87% respectively). Students are increasingly becoming producers and not just users of information, as facilitated by the ease of access to digital technologies.
- **Increase of creative engagement:** Flexible and easy-to-use computer tools allow for new levels of creativity. Increased user engagement results in more self-autonomy for users in terms of publishing, production and programming of user interfaces that enable interaction and the generation of multimedia objects.

Future policies may also need to accommodate a range of attitudes about learning and technology in different student cohorts and disciplinary contexts (Gray, Krause, Kennedy, & Chang, 2009). It is now easy to self-publish blogs and wikis, and social media has taken this to the next level by including peer-evaluation and critique (Cochrane, 2008). Researchers Fagerberg, Landstrom and Martin (2011) postulated that '...we have moved towards a more knowledge-intensive society (the 'knowledge society')' (p.1121).

The increased dependency on technology within the learning environment is no longer a luxury but a necessity, such as described by the field of social information processing.

2.3 Social information processing

Technology is being shaped by humans and society (Fagerberg et al., 2011). Social informatics (SI) as a research field place dual emphasis on humans and technology and attention needs to be paid to the overwhelming demands of social network systems that may lead to physical and psychological strain (Lee, Son, & Kim, 2016).

Atkinson and Shiffrin's information processing model (1968)

The cognitive mechanism for comprehending one's social environment is social information processing. Atkinson and Shiffrin's information processing model (1968) describes the relationship between human cognitive processing of knowledge and associated technologies. The difference between regular information processing and social information processing occurs at the initial, sensory register stage and arises out of the concept of the self and the recognition of others (Slagter Van Tyron & Bishop, 2009). Social cognition provides context and shapes behaviour for all respondents in an interaction and in turn affects the processing motives of the individual (Bandura, 2001).

Systems perspective for information processing (1989)

David Meister (1989) made an important contribution when he argued at the Human Factors Society conference that the appropriate unit of analysis when considering human factors was not the individual, but the system (Dainoff, 2009). A systems perspective included workstation, task, social and organisational factors within an integrated framework and consideration of the interplay between the infrastructure and human factors.

Context is an important part of understanding the technology and its impact on human behaviour and business. The systems approach was criticised as being too 'social', and trying to replace technical determinism with social determinism (Dainoff, 2009).

During the 1980s a more balanced approach emerged, viewing the technical and social components as of equal importance.

Technology Acceptance Model (1980)

An important development during the 1980s was the Technology Acceptance Model (Davis, 1989), arguing that the key to increasing the use of technology was the acceptance of technology (Holden & Karsh, 2010). New constructs in relation to collaborative technologies include compatibility, perceived resource, self-efficacy, sharing and peer influence needs to be included in the instructional design of learning spaces.

Human behaviour and the interaction between people and computer technologies are central to the production of effective online educational systems. The adoption of collaborative technologies is influenced by peers, and the perceived ease of use and instructional design or delivery of educational resources (Cheung & Vogel, 2013) also known as the human affect.

2.4 Human affect

Design of learning activities and assessments to be delivered within an online learning environment is crucial when creating a space where learners can acquire meaningful deep learning experiences as a result of ongoing social interactions and collaborative networks (Kehrwald, 2008).

Field of human-computer interaction (HCI) and instructional design

The field of human-computer interaction (HCI) encompasses the complex and diverse patterns of human interest and aspirations at the intersection with computers and technical devices (Sellen et al., 2009). A deep understanding of our interactions with technology cannot be separated from social, environmental and economic contexts (Rogers, Sharp, & Preece, 2011).

It can be stated that HCI has moved beyond usability factors, now considering the user as a human being within a specific context, with socio-economic, cultural, language and relationship requirements. The goals of HCI research are: (i) improving interaction between humans and computers; and (ii) improving communication and cooperation between humans. Instructional design has an important contribution to make, as it is engaged with influencing human performance and facilitating optimal capabilities using technology efficiently (Merrill et al., 2008).

User behaviour and technology

From the 1960s onwards and concurrent with the advancement of computers, the educational landscape changed to accommodate the way that people interact with technology. During its infancy in the 1980s the field of HCI emerged mainly from computer-scientific and engineering endeavours (Sellen et al., 2009). Technological developments throughout the 1980s resulted in a major shift from expensive mainframes to less expensive computers. Technology-focused studies profile consumers to understand user behaviour based on certain attributes of the technology. A deterministic perspective of technology has influenced humans. Technology has been viewed as a driver for organisational change (Martin, Nightingale, & Yegros-Yegros, 2012).

Usability issues

The Association for Computing Machinery (ACM) hosted the inaugural Human Factors in Computer Systems conference (1992) in Gaithersburg, Maryland, USA (Hewett et al., 2008). This was a significant event in the establishment of a professional community with the aim of investigating human-computer interaction. The predominant theme during this decade was that computer technology and people interact (usability issues) (Dix et al., 1993).

HCI incorporated techniques from cognitive psychology, ergonomics, human-factors and engineering to analyse and optimise the user's interaction with a desktop computer (Sellen et al., 2009; Winters & Toyama, 2009). The user was observed under controlled conditions, inferring what kinds of perceptual, cognitive and motor processes were involved, and theories were developed accordingly (Proctor & Kim-Phuong, 2008; Sellen et al., 2009).

With the onset of the 1990s, the objectives of HCI changed along with the growth of communication networks that linked computers. Researchers also started examining how users interacted with each other (Rogers et al., 2011). Researchers from various backgrounds in more socially orientated sciences, such as sociology and anthropology, began investigating HCI (Ashman et al., 2012).

Ethnographic approaches

The turn of the millennium and the start of the 2000s brought further developments for the field of HCI, as an understanding of the importance of 'ease of use' and 'user satisfaction' to the adoption of new interfaces permeated into the broader consciousness for ICT professionals. The general use of terminology such as 'user-friendliness' and 'user-

experience' in the news media encouraged the adoption of emerging technologies and a belief that the new devices were talismans and part of everyday apparel (Norman, 2004).

A consideration of the multifaceted nature of HCI had also become an integral part of the design processes for most technology companies including online learning institutions (Ashman et al., 2012).

Multi-disciplinary nature of HCI

HCI is now more multi-disciplinary than ever, and instead of thinking about technology in a merely utilitarian fashion, potential for 'provoking, engaging, disturbing or delighting' is considered during the design process (Sellen et al., 2009, p.60). Diverse new areas of research include the role of technology in home life and education, and exploring new areas such as play, spirituality and sexuality (Sellen et al., 2009). Social interaction can therefore be seen as the centrepiece for effective online interaction.

Culture and diversity in HCI

Another important growing body of work worth a mention is examining how interactive products, applications and systems can be appropriated for the distinctive needs of users in developing countries, termed human-computer interaction for development. An important contribution of this research is the investigation of how culture relates to user HCI interface design and end-user practices (Ho, Smyth, Kam, & Dearden, 2009). An understanding of the practical use of online educational resources is informed by factors such as language style reflected in visible text, computer literacy, world views and local conditions (Winters & Toyama, 2009). This contributes to user-friendliness and ultimately adoption of the emerging technologies by educational institutions and instructors.

Systems thinking

Systems thinking enables a focus on relationships between the domains of knowledge, presented in the online educational resources and the patterns of relationships emerging due to planned and enacted collaborative learning activities (Nelson & Stolterman, 2012). It is clear that HCI research has moved beyond usability factors (Nielsen, 1994), now considering the user as a human being within a specific context.

Standard human behaviour means that the socio-economic, cultural, language and relationship requirements are to be considered when designing for usability.

Human as active processor of information

The human within information processing systems was traditionally viewed in terms that were commonly used to describe complex computing mechanisms such as numerical, business or process control applications. New emerging approaches take into account that individuals rely on mental representations, cognitive processes and environmental situations to process data in a variety of settings (Proctor & Kim-Phuong, 2012). This view aligns with constructivist instructional design approaches as is the main theme of this study.

2.5 Instructional design within the context of eLearning

The process of designing educational materials can be called curriculum development, instructional design, instructional systems design and also teaching methods (Willis, 2009a). Instructional design is associated with the integration of information and educational technologies, and has much in common with software design and computer interface design, as well as web-design. The term 'instructional design' (ID) will be employed in this

research to describe learning requiring technical infrastructure, instructional technology or educational technology.

Educational researchers Reigeluth and Carr-Chellman (2009) engaged in several rounds of a Delphi process in which they attempted to build a common knowledge base for the construct and terms related to instructional theories. In Round 2 the largest number of respondents (45%) felt that instruction was the appropriate term to refer broadly to all ways of facilitating human learning and development (Reigeluth & Carr-Chellman, 2009, p. 19). However, the general term education and learning design also enjoyed some support (22%).

Learning design elements

This research focuses on learning design elements needed for effective instructional guidelines for learning interaction within an eLearning course. To understand how instructional design fits within the eLearning context, it is necessary to know *what*, *how*, *when* and *why* it refers to learning activity and assessment resource development and delivery.

Overview of instructional tasks

Clark and Mayer (2008, p. 10) provide an overview of eLearning and set out the tasks that instructional designers engage with within the eLearning context, as shown in Figure 2.1.

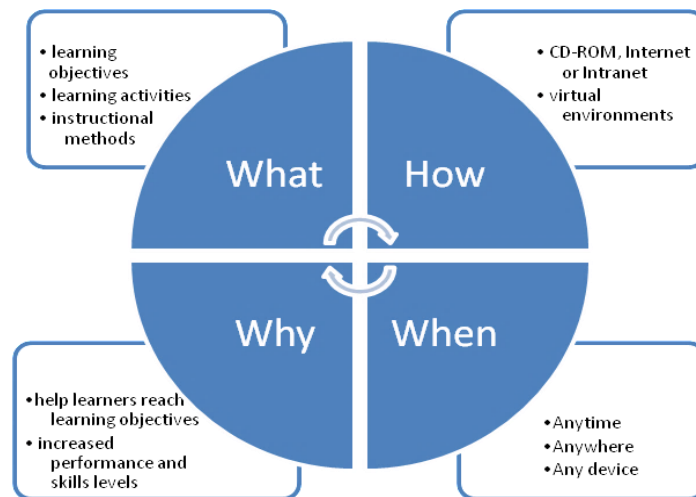


Figure 2.1: Adapted from overview of eLearning (Clark & Mayer, 2008, p. 10)

Within the Australian higher educational context, LMSs such as Blackboard and Moodle support eLearning, as well as blended learning environments (Limniou & Smith, 2010). LMSs allow academic practitioners to deliver course material in the following ways:

- Embedding audios, videos, animations and simulations;
- Delivering online computer-marked assessment supported by feedback;
- Checking students' assignments for plagiarism;
- Interacting through collaboration with their students;
- Providing information on selective portions of course materials;
- Tracking the number of students viewing a course; and
- Finding useful statistical analysis from the students' participation in the online course (Limniou & Smith, 2010, p. 646).

There has been an exponential increase in the development and use of technologies for interaction and communication, and the number of blogs, emails, texts and tweets has gone from zero to in the billions in just a few years (Williams et al., 2011). Higher education

institutions are implementing an expanded range of teaching and learning possibilities, such as e-books, e-journals, blogs and wikis, into the standard LMS.

Academic online practice

Academic online practice is substantially shaped by traditional teaching modes, prescriptive learning outcomes, normative expectations and conventional hierarchies (Williams et al., 2011). Known as 'game changers' that challenge the status quo in the educational arena, George Siemens and Stephen Downes from the Canadian Athabasca University offered the first massive open online course (MOOC), offering free online materials to thousands of students (Downes, 2012).

MOOCs sent waves of repercussions throughout higher education and forced institutions to rethink their own eLearning strategies, and to keep pace with institutions' and communities' expectations by providing open access to resources.

Instructional design principles within eLearning

The applications of instructional design principles are fundamental to effective, efficient and engaging instruction (Merrill et al, 2008). There is proven merit in applying instructional principles to courseware design (Dick & Carey, 2006). Distance education was offered as a way of reaching students in remote areas, or students whom for whatever reason could not be physically present in the classroom. Traditionally it was presented as paper-based study guides and students hand-wrote assignments (Jason, Leslie, & Craig, 2008).

Delivery modes of eLearning

eLearning, however, is not limited to traditional distance education and takes on various forms for courseware delivery in face-to-face, blended and fully online spaces. Instructor-student and student-student interaction can be blended with various methods of computer-

mediated communication (Wise et al., 2009). An eLearning classroom may include elements such as virtual classrooms and online discussion forums, where students can communicate with each other both in the classroom and online (Herrington et al., 2010). Face-to-face workshops, laboratory work and professional placement training may also be included as part of an eLearning course. Blended modes of offering learning and teaching are also known as hybrid or mixed-mode education (C. White et al., 2010), which fall within the realm of eLearning. The multiplicity of ways in which eLearning may be delivered and received often creates confusion when defining the scope, constraints and definitions of what is included within eLearning boundaries.

Horton (2006) offers the definition of eLearning as ‘the use of information and computer technologies to create learning experiences.’ This definition is supported by the Higher Education Funding Council for England and also accepted for the purpose of this study namely ‘*..any learning experience supported by information and communication technologies (ICTs)*’ (HEFCE, 2005, p. 5). Despite attempts to provide a standard definition for eLearning, the terms online learning, web-based education and eLearning (Oblinger & Hawkins, 2005) are often used interchangeably to describe the delivery of education degrees, programs and courses.

Forms of eLearning

In summary, Horton (2006, p. 2) distinguishes between the following forms of eLearning:

- **Standalone courses:** Self-paced without interaction with an instructor or classmate.
- **Virtual classroom courses:** Online classes structured like a classroom course, usually making use of an LMS which may or may not include computer-mediated communication.

- **Learning games and simulations:** Simulated activities that require exploration and lead to discoveries.
- **Embedded eLearning:** eLearning included in another system such as a diagnostic procedure or online help.
- **Blended learning:** Use of various forms of learning to accomplish a single goal.
- **Mobile learning:** Learning by moving about in the world, assisted by mobile technologies such as smartphones and iPads.
- **Knowledge management:** Broad uses of eLearning, online documents, and conventional media to educate entire populations and organisations rather than individuals.

For the purpose of this study, the eLearning environment refers to the virtual classroom, where an online class is structured like a classroom course, usually making use of an LMS. In today's world, learning needs to change very quickly and the concepts and functions of eLearning must continuously adapt (Sangrà et al., 2012, p. 154). Socio-cognitive expectations relate to learning experiences, knowledge sharing and social presence within electronic space and are requisite for effective online learning resources and delivery design.

2.6 eLearning and socio-cognitive expectations

Within eLearning the design focus uses knowledge of humans' intellectual, emotional and social capacity. The five human dimensions used to inform HCI design are physical, intellectual, spiritual, emotional and social being.

Adaptive systems and personalising the online learning experience

Adaptive systems, user modelling and intelligent authoring systems are geared towards personalising the user-interface experience as the technology applications track and analyse end-user transactions, predict needs and respond appropriately (Ashman et al., 2008).

Human emotions play a critical part in every computer-related activity. Within the context of eLearning, student (user) readiness for an online or blended educational mode is related to individual factors, such as technical skills, online learning styles, learning preferences and learning strategies (Smith, 2005).

Human dimensions and emotions

Psychologists identified aspects such as pleasure, aesthetics, fun and flow (or conversely boredom, annoyance and intrusiveness) as having an impact on task, performance and motivation online (Csikszentmihalyi, 2014). Norman (2004), with his research into ‘why we love and hate everyday things’, has modelled how we respond to technology at a visceral or emotional level, as well as in a deliberate and reflective space.

The human dimension, including feelings and emotional responses, has an impact on performance and learning motivation in online, blended and face-to-face environments (Horton, 2006) and cannot be ignored within the design of online learning (Sellen et al., 2009, p.58). This study focuses on examining constructivist learning design elements within online and blended instructor-led eLearning environments within the specific set of challenges facing Australian higher education institutions.

2.7 Issues facing Australian higher education

Within the Australian higher education sector, the most prominent form of eLearning is virtual classrooms managed by means of an LMS (Hrastinski & Aghaee, 2012).

Balancing work, family and online education

For the growing population of adult learners, the demands of balancing work, family, and learning make eLearning a valuable option (Ellis et al., 2007). Gregory and Jones (2009) conducted a study at an Australian university, investigating university academics who teach heterogeneous student cohorts (comprising a mix of local and international students) within a changing university context. According to Gregory and Jones (2009) it is important to

address the lecturer's values, preferences and interests as well as their conceptions of teaching 'in order to achieve changes in teaching practice' p. 782.

The connections between academic values and behaviours in relation to teaching, particularly with heterogeneous groups of students, could increase our understanding of classroom dynamics and effective teaching practices within different environmental conditions.

Bradley review of higher education (2008)

The Bradley review of higher education in Australia (Bradley, Noonan, Nugent, & Scales, 2008) recognises the development of innovative solutions through a range of flexible and collaborative delivery arrangements. The review recommends that members of groups currently under-represented within the system, such as people with low socio-economic status and those from regional and remote areas, be targeted for innovative education opportunities.

This recommendation would be in alignment with eLearning solutions, namely to extend online learning and teaching capacity to enable ease of access to education for potential students living in regional areas or unable to attend class.

Academic higher education interpretation of eLearning environments

The use of the term 'eLearning' means different things to different universities, namely off-campus, distance learning or blended learning (Limniou & Smith, 2010; Tucker & Gentry, 2009; C. White et al., 2010). While technology is an obvious component, the challenge of implementing eLearning within the organisation is to find ways to connect the learners with the content, and offer collaboration whilst maintaining the idea of anytime, anyplace learning (Tucker & Gentry, 2009). That means that it is not enough to provide access to

technological infrastructure, but those equivalent learning processes that may occur face-to-face need to be facilitated within the electronic environment.

Generic skills development

There is increasing pressure for Australian universities to equip their students with 'generic skills', also known as core skills, key skills or graduate attributes (Badcock et al., 2010; Barrie, 2007). These are skills or attributes beyond disciplinary content knowledge that can be broadly applied across various contexts (Badcock et al., 2010), as is expected more and more by employers and within society. Generic skills include the following capabilities:

- Critical thinking;
- Problem solving;
- Interpersonal skills;
- A capacity for logical and independent thought;
- Communication;
- Information management skills;
- Intellectual curiosity and rigour;
- Creativity;
- Ethical awareness and practice, integrity; and
- Tolerance (Badcock et al., 2010).

The acquisition of advanced life skills to effectively innovate using discipline knowledge and operate professionally as a graduate in any business sphere is sometimes referred to as 'deep learning processes' (J. B. Biggs, 2003). eLearning courses are required to create optimal learning processes that would promote generic skills development, and therefore heavily content-driven presentations are not an ideal delivery method. Active learning and

learning activities that engage with collaboration and knowledge construction are better suited to the requirements for developing generic skills and attributes.

Teaching and learning activities

Teaching and learning activities need to be purposefully designed for students attending higher education to develop generic attributes. A sample of 323 students enrolled in single or double arts, engineering and/or science degrees from a research-intensive university in Australia were administered the Graduate Skills Assessment to measure four generic skills, namely: critical thinking, interpersonal understandings, problem solving and written communication. Badcock et al. (2010) noted that online learning environments may be 'conducive to different forms of skill development' and the development of generic skills needs to be included within the general instructional design.

Deep learning

eLearning is broader than merely using technology to deliver a course. The challenge of eLearning environments is to create opportunities for interaction, such as learner-to-learner and learner-to-instructor exchanges that underpin deep learning (T. Anderson, 2004). Deep learning contributes to the development of individuals who are competent, creative problem-solvers fully functioning within their work and home life in today's high demand society (Ertl, 2010).

Instructional design and the issues facing the Australian Higher Education sector is better understood when also considering the influence of various learning theories that contribute to the design of online learning spaces. The next section provides a brief overview of learning theories prominent to this study.

2.8 Learning theories

Following is a brief discussion of the main learning theories highlighting the specific areas that is relevant to this study.

2.8.1 Behaviourism: contribution to instructional eLearning programs

Although in recent years, behaviourism has received much critique, it contributed hugely to the first instructional programs delivered by means of computers and formed the basis of many instructional online strategies. Behaviourism is viewed as the first systematic study of human behaviour (Taylor & MacKenney, 2008) and postulated that learning can be studied objectively by understanding typical humans responses to stimuli. Skinner (1968) developed his model of behaviour modification by implementing the principles of operant conditioning, whereby a systematic approach to positive and negative reinforcement is followed until the behaviour is altered.

Drill-and-practice instructional programs

Taylor (2002) observed that drill-and-practice type instructional programs delivered by means of computers often make use of principles of operant conditioning. Learning events are typically programmed into small sequential steps, and students receive positive reinforcement after supplying the correct response at the successful completion of each sub-task. Incorrect answers result in negative reinforcement and sometimes advice to complete additional work to ensure that the next attempt will be a correct response. This type of computer-assisted learning, often involving a self-paced task on a stand-alone computer, requires instructional design methods and techniques that break learning into small tasks that receive feedback (Clark & Mayer, 2008).

Task analysis

The use of pre-tests and post-tests constitutes task analysis, depending on the knowledge delivered to range from simple to complex. Concrete observable criteria (learning objectives) that form the basis of most lesson plans or modules can be attributed to behaviourism. Behaviourist views of education are that 'if no change in behaviour is observed, then no learning has occurred' (Taylor & MacKenney, 2008, p. 23). However, behaviourists do not observe the cognitive or internal processes necessary or important in measuring human behaviour and learning (Ormrod, 1999) as the focus is mainly on changing the behaviour of a student. In order to further understand the complex mechanism of human learning, other approaches also need to be considered such as cognitive, social learning and constructivist theories.

2.8.2 Social learning theories: contribution to design of social interaction

Social learning theorists view behaviour as an interaction between the individual and the environment (Taylor & MacKenney, 2008). When integrating technology in the classroom, the Alliance for Children (2000) clearly articulated that the four premises that need to be supported are that learning occurs in a context and that respondents are active, social and reflective. These four premises considered fundamental to this research support the social learning approach, and are relevant to students within higher education (Bruner, 1990).

Social learning theorists advocate the inclusion of both behavioural and internal constructs when promoting learning (Bandura, 2001; Vygotsky, 1978). Social cognitive theory presents an interactional model of human functioning. The theory describes behaviour as resulting from reciprocal influences among an individual's social and physical environment; personal

thoughts, feelings and perceptions; and the individual behaviour itself (Bandura, 2001; Taylor & MacKenney, 2008).

Modelling behaviours

Bandura (1970) postulates that individuals may copy, imitate and model behaviours directly from their environment. Learning activities such as working collaboratively in a group, role play, reading and developing stories, and evaluating progress made can be attributed to social learning theories that are often used successfully in eLearning environments (Francisco, 2013). Further study of human cognition during the 1970s recognised that complex internal processing was involved in most learning and perception (Taylor & MacKenney, 2008). This resulted in several cognitive theories of learning, also known as cognitivism.

2.8.3 Cognitive learning theories: contribution to higher-order thinking skills

By the early 1950s, cognitive psychology was denouncing the stimulus-response behaviourist theory of learning. This movement was led by researchers such as Piaget, Vygotsky, Tolman and the Gestalt psychologists (Taylor & MacKenney, 2008).

Taxonomy of educational objectives

Bloom's taxonomy of educational objectives was developed and later revised by Anderson as a way of classifying higher order thinking skills (L. Anderson & Krathwohl, 2001). Cognitive learning such as Bloom's taxonomy has improved our understanding of the social nature of learning, the importance of context in understanding, the need for higher-order thinking and the belief that learners construct their own understanding of the topics they study (Eggen & Kauchak, 1996).

The science of instruction

Robert Gagne (1985) pioneered the science of instruction by developing a series of instructional methodologies applied to computer-based and multimedia training. Gagne identified five domains of learning:

- Intellectual skills;
- Cognitive strategies;
- Verbal information;
- Motor skills; and
- Attitudes.

The instructional conditions necessary for effective learning making use of integrative goals was later further refined by the work of David Merrill's first principles of instruction identifying the principles that are common to instructional theories (Merrill, 2002).

Meta-cognition is a learner's ability to be aware of their cognitive capabilities and use these capabilities to learn (O'Donnel et al., 2013). Instructional cognitivist paradigms encourage learners to use meta-cognitive skills to help in the learning process (Ally, 2007).

Cognitive learning theories emphasise the mental process in learning and common threads of information processing, developmental aspects and contextual information (Gagne & Merrill, 1990). However, they do not always consider the social and environmental context in which the learning takes place in the same way that social learning theories postulates. Social cognitive theories are important when considering aspects such as social networking and the co-construction of knowledge within emerging technologies.

2.8.4 Constructivism: contribution to active construction of knowledge

Constructivism is a philosophy based on the principle that knowledge is created from experience (Almala, 2006). The fact that experience enables constructive learning differentiates constructivism from other learning theories. For example, cognitivism emphasises learning and human cognition, and behaviourism focuses on changes in human behaviour and postulates that learning (understanding, change) is constructed by the learner during the course of the learning process. The constructivist perspective is founded on the idea that humans construct their realities and create their own 'representational models of the world' (Meichenbaum, 1995, p. 23). This notion is pivotal to the research study as knowledge is viewed as co-constructed within social representations and networks.

The evolution of instruction and information-presentation within web-based learning environments has come a long way since the traditional 'point-and-click' objectivist paradigms (Rieber, 2004). Currently, most online learning falls within the realm of constructivist cognitive design (Clark & Mayer, 2008).

Screen-based information is presented in a structured way, and the instruction is sequenced to guide the student through their learning journey (Honebein, Duffy, & Fishman, 1993).

Social constructivism

Social constructivism was advanced by prominent learning theorists such as Dewey (1916), Piaget (1972), Vygotsky (1978) and Bruner (1990), and is primarily viewed as the active construction of knowledge (Von Glaserfeld, 1995). Social constructivism is discussed in more depth later in this chapter as it acts as a point of departure for this study. The timeline of

learning theories highlights the approach of each learning paradigm and the main contributions as summarised by Table 2.1.

Table 2.1: Timeline of learning theories

Timeline	Approach	Paradigm	Main Contributors	Relevance to study
Origin late 1800s; prominent 1930s-50s; contributes to memory, recall, change in behaviour	Behaviourism	<ul style="list-style-type: none"> • Conditioning • Stimulus, response, reinforcement • Positive and negative reinforcement • Mastery learning • Task analysis 	Thorndike (1913) Watson (1913) Guthrie (1952) Skinner (1968)	<ul style="list-style-type: none"> • Meta-cognitive load is promoted by small sequential steps and progression • Task analysis depends on the knowledge delivered to range from simple to complex
Origin early 1920s; prominent 1950s-70s; originators of constructivist ideas and principles	Social learning theories	<ul style="list-style-type: none"> • Cognition develops in social contexts • Zone of proximal development (ZPD) • Scaffolding • Reciprocal teaching • Modelling (observational learning) 	Dewey (1902) Bruner (1961) Bandura (1970) Vygotsky (1978)	<ul style="list-style-type: none"> • Learning occurs in a context • Students are active, social and reflective • Promote learning activities, such as working collaboratively in a group, role play, reading and developing stories, and evaluating progress
Origin 1920s; prominent 1960s onward; contributes meta-cognition, learning objectives, information processing	Cognitivism	<ul style="list-style-type: none"> • Behavioural/performance objectives • Meta-cognition • Sensory register, short-term (working) memory, long-term memory, executive system • Chunking: encoding, retrieval, transfer • Processing: rehearsing, elaborating, organising 	Koffka (1922) Wertheimer (1959) Bloom (1956) Atkinson & Shiffrin (1968) Gagne (1985) Gardner & Hatch (1993) Merrill (2002)	<ul style="list-style-type: none"> • Higher-order thinking and the belief that learners construct their own understanding of the topics • Meta-cognition is a learner's ability to be aware of their cognitive capabilities and use these capabilities to learn

Timeline	Approach	Paradigm	Main Contributors	Relevance to study
Earlier origins, but influential from 1980s onward; contributes knowledge construction, learner-centeredness, social networking, collaborative learning	Constructivism	<ul style="list-style-type: none"> • Knowledge/learning/meaning is constructed • Socially negotiated meanings • Learning by doing • Learner-centeredness • Situated learning, experiential learning, problem-based learning, anchored instruction • Collaborative learning • Articulation, reflection, exploration • Learning environments, virtual classroom, virtual worlds, micro worlds 	Bransford & Stein (1993) Savery & Duffy (1995) Jonassen (2005) Kolb (2014)	<ul style="list-style-type: none"> • Learning (understanding, knowledge, change) is constructed by the learner during the course of the learning process • Communities of practitioners are continually engaged in 'worldmaking', and this contributes to knowledge being co-constructed in a social context.

2.9 Instructional design movements

Instructional designers and academics are searching for ways to create their courses quickly and effectively. Designers and course developers want the learning to be engaging and interactive, and require accelerated approaches that are not complex or costly in terms of finances or human resources (Plaster, 2013). Traditional instructional design models often require large-scale and complex production teams and a high level of resource commitment to complete course designs (Dick & Carey, 2006). During the first decade of the twenty-first century, these broad movements can be identified within the field of instructional design (Willis, 2009b), namely:

- **Traditional ID scholarship** is based on positivist epistemologies and strongly prescribes the design process. The most popular example of this movement is the Dick and Cary model of ID (Dick & Carey, 2006). The generic ID model called the ADDIE model can also be grouped within the traditional instructional design genre.
- **Design-based research (DBR) movement** is an effort to integrate design and research in ways that advance our basic theoretical knowledge and at the same time create higher quality learning and teaching experiences. Examples would be Rapid ISD model and SAM, which are characterised by instructional approaches that develop problem-solving skills and critical and creative thinking skills.
- **Human-centred design** is approaches that intersect with learner-centred approaches to instructional design. It does not prescribe the design process but rather the implementation of learning events, such as scenario-based design, participatory design and global and intercultural design.

- **Constructivist-ID models (C-ID)** are based on interpretive epistemologies and constructivist theories of teaching and learning, such as SAMR and emergent learning. The focus is the context of the design and usability. C-ID models have been around for less than 20 years and are not widely used, nor have they had time to mature through several generations of use and revision cycles (Willis, 2009b). For many educational researchers this is seen as a weakness (Bean, 2014).

eLearning, online collaboration and knowledge construction

A soundly constructed eLearning environment may contribute to individuals who are competent, creative problem-solvers who are fully functioning within their work and home life in today's high demand society. Knowledge construction lies at the heart of the eLearning framework and that is the essence and focus of the design (Gârlașu et al., 2005; Palmer & Holt, 2014).

Design of interaction

The internet has fundamentally altered the practice of computer-based educational practices (O'Donnel et al., 2013; Palmer & Holt, 2012; Pitman, 2013). Horton (2006) remarks that instructional design contributes theories about how human beings learn, strategies for applying these theories and methodologies to carry out the strategies. A longitudinal research study was conducted over the period 2004–2011 and included nearly 6,800 responses exploring students' perceptions of the importance of and their satisfaction with elements of their online learning environment. The finding of this study illustrate that implementing a new technology alone is not enough to improve student satisfaction rates.

The introduction of a new LMS made no significant difference to student satisfaction, the mean ratings of the 2011 to 2012 ratings only 0.21% for students and 0.26% for staff (Palmer & Holt, 2012, p. 264).

Collaboration and authentic learning experiences

Collaboration and authentic learning experiences may improve students' social presence, accounting for 26% of variance within of student satisfaction within eLearning courses (Strong et al., 2012). It can be derived that collaboration and authentic learning experiences have a higher correlation to student satisfaction than changing the technology. Therefore, as relevant to this study, the design of interaction and social presence within eLearning courses is imperative to student satisfaction and improved learning experiences (Kehrwald, 2008; Palmer & Holt, 2014).

2.10 Traditional instructional design models

Following is a brief overview of the main instructional design models that currently dominate the field of eLearning. Also highlighted is how this research may build on the existing work to develop a framework to explain necessary learning design elements to facilitate social networking in online educational systems.

2.10.1 The ADDIE model

The ADDIE model, referring to analysis, design, development, implementation and evaluation, is one of the classic instructional design models. Strongly critiqued for being too rigid and linear, it remains one of the popular models amongst instructional designers due to its ease and simplicity of use (Arshavskiy, 2013), as shown in Figure 2.2.

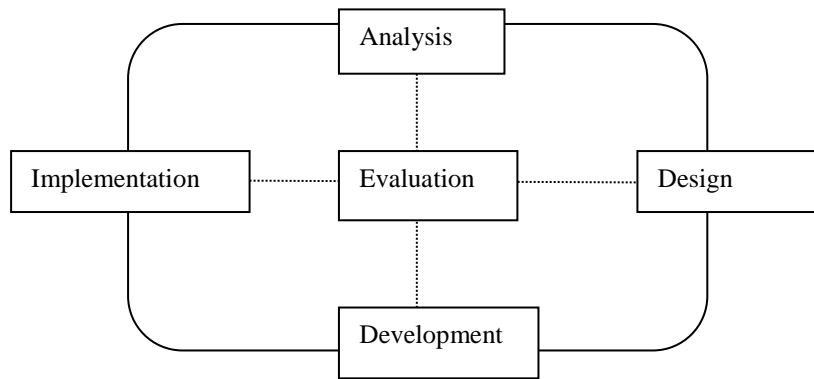


Figure 2.2: The ADDIE model (Arshavskiy, 2013)

- The **analysis phase** clarifies problems, define goals and objectives, and collects necessary data. The student or target audience, technical requirements and learning environment are also explored during this stage.
- During the **design phase** objectives are written and the structure and sequence of the course is defined. A project management plan is also created during this phase, stipulating deadlines, milestones, implementation details, budgeting and risk factors.
- The **development phase** brings the design to life by using text, storyboards, graphics and multimedia, and by assembling all these elements into a compelling course design.
- In the **implementation phase**, the course is delivered to the audience.
- The **evaluation phase** measures the effectiveness of the course by assessing learning retention, student satisfaction and overall project goals. Although this is often defined as the final stage of the ADDIE model, evaluation needs to occur at all the phases of the design process (Arshavskiy, 2013).

Currently, the use of this model remains very content-based, and preference is given to the presentation of information, text and multimedia design. Not sufficient attention is given to learner pathways and design of social interaction during the design and development phases of the ADDIE model (Dobre, 2012). This study attempts to address the gap by investigating how the use of certain learning design elements may enhance the design of social interaction.

2.10.2 Dick and Carey Systems Approach model (2006)

The Dick and Carey Systems Approach model (2006) focuses on selecting and organising the appropriate learning content for each learning module, in such a way that the learner's needs, skill and context are incorporated into the course design (Dick & Carey, 2006). This approach is based on Robert Gagne's conditions of learning and theories of instruction (Gagne, 1985). This model is widely implemented by curriculum developers in higher education (Arshavskiy, 2013).

The Dick and Carey Systems Approach is composed of ten steps, which include nine basic steps and an evaluation of the effectiveness of the instruction as illustrated by Figure 2.3.

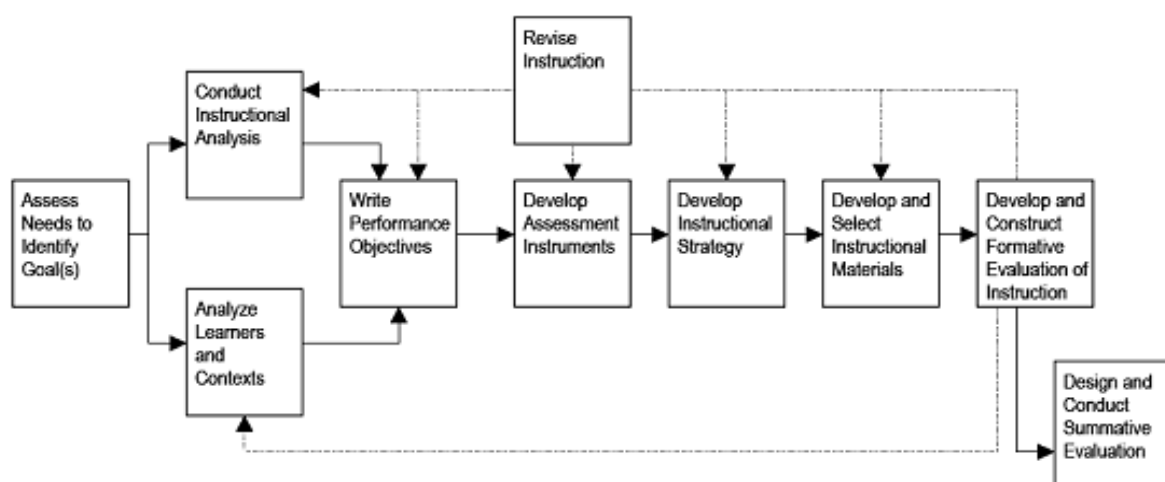


Figure 2.3: Dick and Carey Systems Approach model (Dick & Carey, 2006)

Steps 1-3 are dedicated to conducting the needs assessment and instructional analyses, and analysing the learners to identify instructional goals.

Step 4 is dedicated to writing the performance objectives specifying the skills, conditions and criteria for learning.

Steps 5-6 involve the development of the assessment instruments and instructional strategies for presenting the information, testing and learning activities.

Step 7 aims to develop and produce the instruction.

Step 8 involves collecting data for conducting a formative evaluation.

Step 9 requires the revision of the lesson using the data collected from the formative evaluation, analysis, objectives, assessment instruments and instructional strategies and content.

Step 10 involves conducting a summative evaluation to measure the success of the instruction.

The Dick and Carey model is based on the conventional core elements of the ADDIE model. However, the steps described are more comprehensive and detailed. Critics expressed that the step-by-step prescription is too extensive and increases costs because it takes too long to apply. The output of this systems-oriented model is often an entire course curriculum. To create this large and complex product, a team and a high-level resource commitment are required. The team will also need to include an instructional design expert able to perform extensive front-end analysis and formative evaluation (Gustafson & Branch, 2002).

2.11 Design-based research (DBR) movement

2.11.1 Rapid ISD model

The accelerated learning rapid instructional design (Rapid ISD) model created by David Meier is ideal for those who work with tight deadlines, limited budget and constantly changing content (Meier, 2000). Meier (2000) believes that traditional instructional design models are too time-consuming and controlling. He also states that these models are presentation-based rather than activity-based.

There are four phases in the Rapid ISD model, namely:

- **Preparation:** Arouse interest and motivate learners by stating goals and removing learners' barriers.
- **Presentation:** Encounter new knowledge and skills by appealing to all learning styles and incorporating interactive presentations and discovery into the learning experiences.
- **Practice:** Integrate new knowledge and skills by incorporating games, hands-on activities and skill-building exercises as well as providing substantial corrective feedback to the learner.
- **Performance:** Allow time to apply the new knowledge and skills and reward the use of these skills.

According to Rapid ISD, people learn more from application with feedback than from presentations. It replaces media-heavy dissemination-based non-interactive courses with

activity-based courses. However the model does not incorporate the analysis and evaluation phases which are crucial in the development of an eLearning course (Arshavskiy, 2013).

2.11.2 Successive Approximation Model (SAM)

SAM is an agile instructional design model created by Michael Allen (2003), a recognised pioneer and leader in the design of interactive multimedia tools and applications. The model emphasises collaboration, efficiency and repetition. To create the best possible outcome instructional designers should focus on producing usable and reusable products as quickly as possible. The goal is to take smaller, more flexible steps within a larger framework to achieve high quality in training and learning, as opposed to following a rigid step-by-step process. The model enables instructional designers to move quickly through the initial phases of course design via a rapid prototyping, and considers collaboration and early evaluation as critical to the successful completion of the project. SAM expects that mistakes will be made, and that stakeholders will change their minds throughout the project (Arshavskiy, 2013). The SAM2 model is divided into two phases:

- **Preparation phase**, where instructional designers gather background information and brainstorm ideas about the project together with stakeholders and the entire team.
- **Iterative design phase**, where the instructional designers and teams rotate through design, prototype and review, making decisions and refining the prototype.

The iterative development phase begins with the design proof and produces three deliverables, known as the alpha, beta and gold releases, including checklists and reviews of the various releases. SAM has been critiqued for its fast-paced iterative process that does not rigorously consider all the elements of the analysis phase in the development of the

product. There is also a danger in conforming to everyone's suggestions and changes (Plaster, 2013).

2.12 Human-centred design

There are a myriad of HCI user-centred design techniques. The techniques discussed below are briefly highlighted as they intersect with human-centred instructional design approaches within eLearning environments.

2.12.1 Scenario-based learning design

Scenario-based learning design incorporates a group of techniques that include narrative descriptions of envisioned episodes (user-interaction scenarios) in such a way as to enable user experiences (Errington, 2003; Rosson & Carroll, 2009). A scenario consists of a setting or situation where one or more actors with personal motives, motivations, knowledge, capabilities and tools interact with each other. The narrative or story describes a sequence of events that usually lead to an outcome. Within scenario-based design, the narrative is written to evoke an image of real people doing real things, and thereby enables the readers to empathise with the people in the situation. This leads to questions about motivations, intentions, reactions and satisfactions (Rosson & Carroll, 2009). This may then increase the usability as well as the usefulness of the system (Yin-Leng, Dion Hoe-Lian, Ee-Peng, Zehua, & et al., 2005). The narrative or story also allows designers to reflect on their own ideas. The challenge is to 'design software that works for people in a context' (Bardram, 2000, p. 237), and not merely in the traditional sense of reliability and efficiency. Scenarios are work-orientated design objects and may address representational bias in human cognition, namely that people overestimate the relevance of things that are familiar to them. However, scenario-based design does present certain pitfalls. The very characteristics that make a story realistic may also lead designers to adopt too narrow a view of the context and

situation.

Scenario-based design can also be used to support collaborative activities, as demonstrated by the study of a nation-wide hospital information system in Denmark (Bardram, 2000). The findings of the study in Denmark showed that collaborative scenarios were important thinking tools for grounding the creative envisioning of how collaborative work could be organised. This in turn has important implications for designing collaborative learning activities such as wikis (Su & Beaumont, 2010) and group assignments (Oreilly et al., 2010) within the eLearning environment. Collaborative scenarios are also a fundamental tool in the participatory design sessions with users (Bardram, 2000).

2.12.2 Participatory design

Participatory design is aimed at bringing users' knowledge and perspectives directly into computer design and specifications. Some participatory design techniques include storytelling and story collecting, workshops, photography, drama, videos and photos, games for analysis and design, and co-creation of descriptive and functional prototypes (Bannon & Ehn, 2013). Participatory design of collaborative spaces requires a certain way of thinking, and new kinds of methods and openness to bring new voices into a conversation. The technology available and participatory design methods enable course developers to re-imagine courseware by listening to their students. Instructors and IDs obtain better insight into how students interpret their online education. An explorative study involving a sample of teachers and students in the Netherlands (Könings et al., 2010) attempted to develop an approach based on the principles of participatory design for student participation in instructional design. Findings from the study indicated that the barriers to the inclusion of

students in the instructional design process are not insurmountable, and there are compelling reasons for implementing participatory design in education.

Co-national friendships give students an opportunity to enhance their understanding of the new culture through discussions, social interaction, and intellectual exchange with other students who are experiencing the same emotions (Barnes, 2012). Forming social networks and relationships is important to the successful implementation of participatory design (McFaul, 2016). We need to ask the question as to how classroom collaboration, participatory design and multi-disciplinary research may encourage critical thinking, creativity and innovation to find more sustainable solutions for these problems (C. Moore & Signor, 2014). This question is also kept in mind when conducting the research study.

2.12.3 Global and intercultural design

Globalisation, referring to the process of worldwide production and consumption affects computer-mediated communication, which in turn affects user interface (UI) design. International issues such as geographic, political, linguistic and typographic issues hold their own special considerations and challenges for the user interface (Lauwers, 2010).

Intercultural issues relate to the religious, historical, linguistic, aesthetic, gender and other more humanistic issues, sometimes crossing national boundaries. Examples are calendars that acknowledge religious time cycles, terminology reflecting popular culture, and web search criteria reflecting cultural preferences (Marcus, 2015). Website visitors stay twice as long at local language sites, and customers are three times more likely to buy if the site is in their own language. Users therefore do respond positively to environments that they are familiar with and that bear resemblance to their local conditions.

While most eLearning environments have been designed around user needs identified in the 1990s, a new cohort of students is currently studying at higher education institutions. These digital students are young adults that grew up with technology integrated into their everyday lives and they are comfortable with technologies.

Current students expect technology to support the way that they learn, which is task-oriented and experiential. The main characteristic of these students is that they prefer to receive information quickly and use multiple/multi-modal communication channels to access information and to e-communicate with peers and academics (Limniou & Smith, 2010). In strong contrast, students from developing countries may have had limited exposure to digital technologies. Language, technical skills and socio-economic barriers present further constraints (Ho et al., 2009).

2.13 Constructivist instructional design

Constructivism declares that knowledge is acquired through collaboration with meaning negotiated from multiple perspectives (Almala, 2006). Constructivism maintains that educators craft learning experiences into an active, experiential process in which learners create new ideas and think through problems (Zeedick, 2010). Advanced technology provided valuable tools to design and develop eLearning environments within a constructivist approach (Almala, 2006; Jonassen, 2005).

Constructivism and the eLearning classroom

When you walk into a traditional lecture theatre, you expect to find long rows of tables and chairs, a podium for the lecturer, an overhead projector, and a screen on which the

presentation will be viewed. You may also expect to see a whiteboard and markers where the lecturer may be writing some additional notes.

Currently when students arrive, they are sitting down, not only with pens and paper, but also with laptops, tablets and smartphones (Jason et al., 2008). Students in the classroom may have set up their own backchannel on Twitter, writing comments about the lecture on Facebook, and after the lecture reviewing similar content presentations on YouTube (Palmer & Holt, 2014). This scenario comments on the social learning revolution that is currently underpinning the educational context.

Co-construction of knowledge

The constructionist point of view need not lead to relativism and the abandonment of every claim of knowledge (Schön, 1987). Each created world makes it possible to discover the consequences of one's actions, make inferences and establish by experimentation whether one's way of framing the situation is appropriate. All interpretations can be viewed as essentially creative and might be provided as possible solutions to a particular event.

Rather than finding a 'ready-made world' (Goodman, 1978), the practitioner makes and remakes versions of the world using words, numerals, pictures, sounds and other symbols.

Schön (1987, p. 36) invokes the notion that in the constructionist view, our perceptions, appreciations and beliefs are rooted in the worlds of our own making that we come to accept as reality. Communities of practitioners are continually engaged in what Nelson Goodman (1978) calls 'worldmaking', and this contributes to knowledge being co-constructed in a social context. The sense of knowledge constructed in a social context is pivotal to this research study as it aligns with constructivist learning design approaches. The impacts of technology on learning design elements are also being considered within the

scope of this study.

2.14 Constructivist instructional design models

2.14.1 Substitution Augmentation Modification Redefinition (SAMR) model

Effective learning in any environment requires sound design, management and pedagogy (Alessi & Trollip, 2006). The Substitution Augmentation Modification Redefinition (SAMR) model developed by Dr Ruben Puentedura (Lubega, Mugisha, & Muyinda, 2014) aims to support academics, course developers and instructional designers to integrate learning technologies at various stages of complexity. The SAMR model describes four levels of technology integration that increase in complexity and effect, from simple substitution to a more complex redefinition where technology use can provide opportunities to create that would not have been possible without the technology. As universities embrace online learning technologies, the potential exists for authentic learning to be widely used to support student learning (Herrington et al., 2010).

The practical example set out by Table 2.2 highlights the difference between each of the stages and what can be achieved when students are provided with authentic opportunities within the redefinition stage.

Table 2.2: Example of SAMR model (Lubega et al., 2014)

Substitution	Augmentation	Modification	Redefinition
Students use a word processor for their writing. Students can now easily edit and format their writing.	Students improve their writing through the tools within the word processing program, e.g. spelling check, grammar check,	Shifts the focus of some of the writing task to be collaborative.	Collaborate with other classes locally or globally on a common issue or problem, using web conferencing.
Published work is now printed rather than handwritten. Students can save various drafts of their work.	thesaurus, word count. Images and graphics are easily embedded within the document.	Students use an online collaborative space (virtual classrooms – wiki) to write in small groups, conduct peer editing and feedback,	Students research and share their findings within a virtual classroom, in order to find a common

Educational researchers Martin, Nightingale and Yegros-Yegros (2012) observed that new research fields in the social and natural sciences often originate at the intersection of established disciplines when researchers from neighbouring disciplines realise they share a common interest (Clark & Mayer, 2008). Shared conceptual, methodological and analytical frameworks may develop over time (Boyle & Ravenscroft, 2012). Various disciplines explored, from different perspectives, how people (users) appropriated computers, interpreted them, and socially and emotionally experienced their relationships with technology. This has generated the movement towards more comprehensive ID models.

Understanding the new forms of human interaction with computer technologies will involve asking questions about the qualitative process, potential and change, rather than the quantifiable attributes and capabilities alone (Sellen et al., 2009). A generally accepted way to further personalise the web experience is the use of portals, online communities, wikis, blogs and intranet systems (Oreilly et al., 2010). Not only do these channels provide navigation through which users can find resources, but they also bring about a shared cultural space (Ashman et al., 2008) such as a knowledge-sharing space defined by social learning presence and social interaction.

2.14.2 eLearning ecologies

Emergent models of eLearning offer important considerations to this study, as it shows the importance of meta-cognition, collaborative learning, active knowledge-making and the impact of recursive feedback (Cope & Kalantzis, 2013).

Educational researchers Bill Cope and Mary Kalantzis (2013) from the University of Illinois proposed the following seven affordances for eLearning ecologies:

- **Ubiquitous learning:** refers to anywhere, anytime learning;
- **Multimodal meaning:** multimedia modalities as portrayed by text, image and sound;
- **Active knowledge-making:** students are encouraged to construct their own meaning from the learning taking place (knowledge-sharing space and knowledge construction);
- **Recursive feedback:** feedback on the learning progress (formative assessment);
- **Collaborative intelligence:** knowledge constructed by group and team processes and general society understandings (social learning presence and social interaction);
- **Meta-cognition:** reflecting on learning processes and constructs (meta-cognitive load);
- **Differentiated learning:** individualised and personalised learning processes (Cope & Kalantzis, 2013). Figure 2.4 illustrates the seven affordances and how they interact with each other.

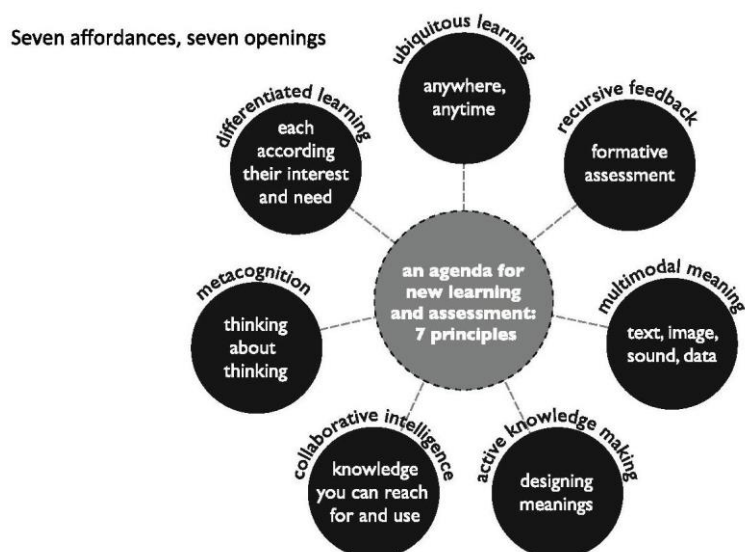


Figure 2.4: Seven affordances for eLearning ecologies (Cope & Kalantzis, 2013)

When considering the eLearning ecologies model against the more traditional instructional design models such as ADDIE and SAM, it is clear that the focus of design is changing from a product to process orientation. Whilst instructional design models achieved the purpose of outputting static design such as paper- and/or CD Rom or webbased learning materials, different learning design elements also need to be considered when the environment is organic and chaotic, such as the case with social networked learning spaces.

2.15 Objective-rational vs constructivist-interpretivist instructional design

Constructivist instructional design models are based on interpretivism and hermeneutics (Danner, 1995) and assume that students are best served by helping them understand how to learn as opposed to finding the right set of answers. The models typically emphasise helping students construct their own understanding of a topic through experience in context (e.g. problem-based learning, authentic assessment). Objective-rational models such as the ADDIE model are underpinned by a positive approach and step-by-step instruction relying on direct instruction, while constructivist models are interpretive and rely on experiential learning, as shown in Table 2.3.

Table 2.3: The choices made by developers of objective-rational and C-ID models

Family of ID models	Epistemology	Learning/Instructional
Objective-rational (e.g. Dick and Carey, ADDIE)	Positivism, postpositivism	Behaviourism, information processing theory, cognitive science, instructionism, direct instruction
Constructivist instructional design models (e.g. SAMR,	Interpretivism, hermeneutics	Constructivism, social constructivism, Deweyian progressive education

Objective-rational instructional design models tend to focus on sequential, objective knowledge while constructivist-interpretivist models are recursive, linear and sometimes chaotic, as further explained in Table 2.4.

Table 2.4: Summary of comparison between objective-rational and constructivist-interpretivist instructional design (C-ID) models (Willis, 2009b, pp. 22-23)

Objective-rational	Constructivist-interpretivist
The design process is sequential, objective and focused on experts who have special knowledge.	The design process is recursive, nonlinear and sometimes chaotic. The focus is the context of the design and usability. Plan for recursive evaluation by users and experts.
Includes a precise plan of action with clear, behavioural objectives that are essential. Proceed through design process in a systematic, orderly and planned manner.	Planning is organic, developmental, reflective and collaborative. Includes the notion of participatory design as a collaborative team effort by all users.
Precise behavioural objectives are essential, and considerable investment in instructional objectives and objective assessment instruments.	Objectives do not guide the development, rather objectives emerge during the process of collaborative development.
Careful sequencing by breaking complex tasks into subcomponents, and paying attention to subskills as well as the events of instruction.	Instruction emphasises learning in meaningful contexts, and favours strategies such as anchored instruction, situated cognition, cognitive apprenticeships and flexibility hypertext.
Emphasis on delivery of facts, enhancement of skills, favours drill-and-practice and direct instruction methods. Invest most in summative assessment methods as a way of judging competence.	Favours instructional approaches that develop problem-solving skills and critical and creative thinking skills. Invest most in formative assessment methods as a way of learning.

The model emphasises the collection of objective data such as entry behaviours, concept analysis, pre-tests, post-tests.

The model includes types of assessment such as portfolios, ethnographic studies, observations, focus groups, peer reviews and peer assessments.

Positivist and post-positivist epistemologies generally assume that scientific research can discover universal laws and rules of human behaviour that can then be generalised to new settings (Aspin, 1995). There are quite a number of instructional design theories, techniques and models, and instructional designers often develop their own style by making eclectic use of a number of different approaches (Bean, 2014).

A radical version of constructivism built on the teachings of Piaget was offered by Von Glaserfeld (1995). Radical constructivism proposes that cognition serves the subject's organisation of the experiential world, and not the discovery of an objective ontological reality. The notion of truth is therefore replaced with the notion of viability within the subject's experiential view, important for knowledge-making and knowledge construction within a collaborative setting as each person contributes from their understanding to form a cohesive whole.

2.16 Selection of the learning design elements for this study

Traditional instructional design prescribes the design process, but does not necessarily provide a framework for the social learning interaction within the knowledge-sharing space. Learners ideally need to experience a sense of belongingness through sharing personal characteristics as this promotes social learning presence (Shea, Pickett, & Pelz, 2004). Learners furthermore require access to shared knowledge-building tools that support conversation and collaboration amongst the group. Collaborative tools enable communities of learners to co-construct meanings for problem-based inquiries (Jonassen, 1999). Bradley

(2010) cautions that the presence of communication technology tools alone does not assure that the construction of new knowledge would take place.

The learning content, learning task or learning environment needs to attribute to demands on meta-cognitive and self-regulation processes such as planning, monitoring or regulating (Schwonke, 2015). Constructivist learning environments allow for learners' social and meta-cognitive skill development and are designed for flexible, creative solutions to situations to promote the construction of knowledge. Constructivist educational processes such as knowledge sharing, meta-cognitive load and knowledge construction are integral to constructivist instructional design. However, instructional designers and course developers do not have a shared meaning on the implementation of these processes in higher education academic practice (Kehrwald, 2008; Rennie & Morrison, 2013).

Instructional designers and course developers often follow the objective-rational ID models such as Dick and Carey and ADDIE, which assume that the ID process is one of applying known laws and rules to new learning contexts (Willis, 2009a). These models select a set of methods developed within the theories of learning derived from behaviourism and cognitive science. The objective-rational ID models worked well during the late 1980s and 1990s when most of the learning content was presented in a static and sequential way, such as paper-based distance education materials or CD-ROM self-paced programs (Arshavskiy, 2013). Universities could afford to allocate sufficient financial and human resources to spend months on developing comprehensive distance programs, often based on the Dick and Carey model (Clark & Mayer, 2008). During the late 1990s and early 2000s, learning management systems became more accessible and user-friendly, and academic staff were expected to design materials that previously would have been constructed by teams of

instructional designers, graphic artists, language editors and multimedia designers (Majeski et al., 2015).

The introduction of social media tools (e.g. discussion boards, wikis, blogs and e-journals) added another layer of design complexity that did not sit well with traditional linear instructional design models (Singh & Hardaker, 2014). Agile models that include collaboration, efficiency and repetition and focus on producing usable and reusable products such as SAM became more popular during the early 2000s (Allen, 2003).

The constructivist-interpretivist favours instructional approaches that develop problem-solving skills and critical and creative thinking skills, and are derived from constructivist viewpoints (Barnes, 2012). New human-centred techniques that are organic by nature, such as storytelling, games and co-creation, were included in eLearning design (Könings et al., 2010). Emergent models for eLearning such as eLearning ecologies (Cope & Kalantzis, 2013) refer to the educational processes, such as active knowledge-making and meta-cognition, rather than the educational products developed for static learning materials.

With the introduction of social media tools such as wikis and blogs, and social learning presence and social learning interaction are imperative for social networking environments (Williams et al., 2011). This study therefore investigates the learning design elements associated with concepts such as social learning presence, learning interaction, meta-cognitive load and knowledge-sharing space as applied within eLearning for the purpose of creating an environment conducive to social networking as premise for effective knowledge construction.

Selection criteria

The constructivist instructional design models served as a frame of reference for the learning design elements that were selected, namely:

- (i) **Substantial empirical evidence** to show a significant difference or impact on student engagement, student motivation and learner attrition and retention;
- (ii) **A strong empirical correlation** between the identified learning design elements and social learning interaction and social networking; and
- (iii) **Recognised by multiple researchers** as learning design elements within social constructivism contributing to social networking and co-construction of knowledge.

The following five learning design elements were selected for the purpose of this research study as complying with the selection criteria and next discussed, namely:

- (i) Social learning presence;
- (ii) Social learning interaction;
- (iii) Knowledge-sharing space;
- (iv) Meta-cognitive load;
- (v) Knowledge co-construction.

2.16.1 Learning design element 1: Social learning presence

Social learning presence fosters that important sense of belonging to the group. Educators may reinforce the sense of belonging and self-esteem by ensuring the engagement of learners in the community (Wenger, McDermott, & Snyder, 2002). Facilitation of online tasks encourages social learning presence within academic online practice (Kolb, 2014).

The social environment affects motivation, attitudes, teaching and learning. Using collaborative learning software applications such as Blackboard Connect, synchronous discussions which allow respondents to hear and see each other in real time can be coordinated amongst respondents around the world (J. Bradley, 2010). Emerging technologies such as audio capabilities and rich visual cues allow respondents to communicate with each other (Cope & Kalantzis, 2013). This communication can take place through web cam, microphone, text, drawings, telephone or file upload. It enables personalised blogs, wikis, websites and podcasts, and thus a more meaningful human presence can be established (J. Bradley, 2010). Jonassen (1999) was a major contributor to the field of designing constructivist environments, and commented on the importance of online interactions that required purposeful design.

In summary, students that are currently entering the higher education system are expecting social interaction from their online learning environments (Tucker & Gentry, 2009; Wise et al., 2009). Students often use interactive technologies that enable social interaction; responsive and interactive online instruction; appropriate feedback and assessment mechanisms; and engaging, sensory stimulating and diverse personalised learning environments.

Table 2.5: Definition of social learning presence defines the learning design element ‘social learning presence’ and explains what this learning design element is enabling using current available technical infrastructure.

Table 2.5: Definition of social learning presence

SOCIAL LEARNING PRESENCE	Main contributors
Definition	
The term ‘social learning presence’ refers to the robustness of the learning design to support learners to project themselves socially and affectively into a learning community.	T. Anderson (2004) Jonassen (2005) J. Bradley (2010)
Rationale	
When designing a web-based learning environment, it becomes crucial to create a space where learners can acquire meaningful deep learning experiences as a result of ongoing social interactions and collaborative networks.	Cope & Kalantzis (2013) Kolb (2014)

2.16.2 Learning design element 2: Social learning interaction

Social learning presence relies heavily on how the social learning interaction within a course is structured and facilitated by the inclusion of social media and online communication technologies. The emergence of disruptive technologies such as mobile learning and Web 2.0 technologies (Cochrane, 2008) also facilitates the move from cognitive pedagogies to social constructivist pedagogies. Engaging the student as an active respondent in education provides a richer environment conducive to student-centred learning (Zeedick, 2010).

Educational researcher Gilly Salmon (2000, pp. 25-26) developed a five-step model which outlines the steps required to effectively foster online student engagement through the use of discussion boards. The five steps are: (i) access and motivation of student participation; (ii) online socialisation where students are encouraged to find their online identity; (iii) information exchange where students are supported to cooperate and share; (iv) knowledge

construction where communication is dependent on common understandings; and (v) development where students reflect on learning goals and the learning process. This model was further enhanced by the introduction of 'e-activities' (Salmon, 2002) that provide resources and ideas for various online activities for moderators to perform during each of the stages. Salmon's e-moderation model has been widely adopted by higher education institutions across the world (Chew et al., 2008).

However, eLearning courses have evolved from only a discussion-forum led activity base, and many courses now also include blogs, wikis and twitter hashtags as additional forms of online communication (Lubega et al., 2014). Salmon's five steps of e-moderating are very sequential and hierarchical, and may be disputed in the current flow of immediacy possible within social media. Such a strong hierarchical structure may not be valid to introduce online socialisation and knowledge construction (Majeski et al., 2015).

An important pitfall with constructivism is that too much onus may rest upon the learner to integrate the content (Wheelahan, 2009). With the rise of the world wide web, certain knowledge and information that is already in the public domain may not necessarily need to be constructed again by the learner, but merely assimilated, adopted, critiqued or evaluated. The online collaboration framework, an adaptation of Garrison, Anderson and Archer's (2000) community of inquiry model, is used to examine international online collaborative experiences aimed at assisting the learner to assimilate learning content.

This online collaboration framework is of importance to this research study as it starts to capture some of the social constructivist learning design elements required in a teaching and learning framework, such as (i) developing and maintaining teacher presence; (ii) fostering social presence; (iii) scaffolding learning; (iv) exploring cognitive presence; (v) participating in critical discourse; and (vi) creating knowledge in action.

Much attention has also been given to the creation of online learning communities (including asynchronous learning such as online discussion forums, wikis and blogs) that encourage students to assume responsibility towards their own learning, as well as constructive solutions to real-life problems (Jones, 2007). Table 2.6: Definition of social learning interaction defines the learning design element ‘social learning interaction’ and explains the learning design element to incorporate opportunities for students to collaborate in face-to-face, blended and fully online environments.

Table 2.6: Definition of social learning interaction

SOCIAL LEARNING INTERACTION	Main contributors
Definition	
‘Social learning interaction’ refers to how the design of the online learning interaction supports and contributes to the creation of a social learning system.	Garrison et al. (2000) Salmon (2002) (T. Anderson, 2004)
Rationale	
Students are encouraged to assume responsibility towards their own learning, effective collaboration and meaningful engagement, as well as constructive solutions to real-life problems.	Jones (2007) Cochrane (2008) Cope & Kalantzis (2013)

2.16.3 Learning design element 3: Knowledge-sharing space

Integral to the constructivist process is the development of students' critical thinking skills, problem solving and team skills, experiential learning and interdisciplinary knowledge (J. Bradley, 2010). Professional discipline knowledge requires the development of generic skills to enable application in context, which is strengthened by social learning interaction. This type of interaction allows students to demonstrate competence within a peer-to-peer or collaborative setting that would also ultimately represent the workplace environment (Rennie & Morrison, 2013).

Constructivist environments focus on the organic learning process and can therefore not be designed in a static, linear fashion (Cope & Kalantzis, 2013). Rather, a space needs to be created for learners where they can engage in reflective practice (Ashman et al., 2012). It is also debatable exactly how much new knowledge is required to be constructed by learners, and every delivery of a course requires ongoing discussion of relevant assessments aligned with the learning outcomes specified. Moore (1989) identified three types of interaction which must be present for effective learning interaction:

- **Learner-instructor interaction:** motivation, feedback, and dialog between the teacher and student.
- **Learner-content interaction:** the method by which students obtain intellectual information from the material.
- **Learner-learner interaction:** the exchange of information, ideas and dialog that occurs between students.

In the context of eLearning, learner-technology-learner interactions that include the exchanges and interactions facilitated by the various technologies are becoming important learning design elements (L. Anderson & Krathwohl, 2001). For example, if students struggle to use the keyboard or do not have an adequate level of computer literacy and cannot easily navigate the eLearning environment, they may be frustrated by the interactions within the online environment, regardless of the quality of those interactions (Almala, 2006).

Constructivist educators make learning an active process in which learners create new ideas and connections through the reconstruction of experiences (Von Glaserfeld, 1993). Reigeluth (2009) recommends that transforming the educational system, and therefore also instructional systems, to a customised, learning-focused system can provide a solution for meeting the new educational needs. Table 2.7: Definition of knowledge-sharing space describes the learning design element required for online or blended delivery of courseware to enable students to share knowledge.

Table 2.7: Definition of knowledge-sharing space

KNOWLEDGE-SHARING SPACE	Main contributors
Definition	
'Knowledge-sharing space' is defined as how the learning design is maximised to allow for sharing and distribution of knowledge in a safe space.	Moore (1989) Jonassen (1999) L. Anderson and Krathwohl (2001)
Rationale	
Constructivism maintains that educators craft learning experiences into an active, experiential process in which learners create new ideas and think through problems.	Reigeluth (2009) Ashman et al. (2012) Cope & Kalantzis (2013) Rennie and Morrison (2013)

2.16.4 Learning design element 4: Meta-cognitive load

Meta-cognition is a learner's ability to be aware of their cognitive capabilities and use these capabilities to learn (Biggs & Tang, 2011). When learning online, learners should be given the opportunity to reflect on what they are learning, collaborate with other learners, and check their progress (Kirschner et al., 2006). Students should be encouraged to assume responsibility towards their own learning, effective collaboration, meaningful engagement, as well as constructive solutions to real-life problems (Almala, 2006).

In an attempt to compensate for low levels of social interactivity, courseware designers incorporated various forms of synchronous (same-time) learning, such as live virtual classrooms and chat facilities (Allen, 2003; Ally, 2007; Clark & Mayer, 2008). The hybrid or blended courseware design model became prevalent, and students were required to attend face-to-face workshops, seminars or experiential learning to supplement their eLearning coursework (Clark & Mayer, 2008).

Difficulty relating contents of different representations reflects either cognitive or self-regulation problems. Having trouble understanding the didactic function of different (types of) external representations probably reflects meta-cognitive knowledge deficits more than cognitive deficits (Schwonke, 2015, p. 176). Structuring learning activities in such a fashion that meta-cognitive load is managed can help learners gain deeper understanding, acquire knowledge and develop skills quicker (Cope & Kalantzis, 2013). An example of a meta-cognitive tool would be some sort of overview (e.g. a table) of accomplished and open tasks (to facilitate monitoring and planning) (Schwonke, 2015). Table 2.8 provides a definition of meta-cognitive load.

Table 2.8: Definition of meta-cognitive load

META-COGNITIVE LOAD	Main contributors
Definition	
‘Mega-cognitive load’ refers to the sequence and progression of the online learning experience in support of meta-thinking.	J. Biggs (2003) Kirschner et al. (2006)
Rationale	
Meta-cognition is a learner’s ability to be aware of their cognitive capabilities and use these capabilities to learn. When learning online, learners should be given the opportunity to reflect on what they are learning, collaborate with other learners, and check their progress.	Clark and Mayer (2008) Cope & Kalantzis (2013) Schwonke (2015)

2.16.5 Learning design element 5: Knowledge co-construction

Jonassen (1999) argues that knowledge construction does not occur in isolation, but is the result of teams of people working together to solve a problem, thus the necessity for collaborative online tools. Instructional cognitivist paradigms encourage learners to use meta-cognitive skills to help in the construction of knowledge (Ally, 2007). Constructivism anchors the concept of knowledge in the human being (individually and socially) (Von Glaserfeld, 1995), and under its influence cognitivism and instructional design move towards a more human-centred view of knowing and knowledge (Ertl, 2010). The essence and uniqueness of knowledge is based on four central points, namely that knowledge:

- lives in the human act of knowing;
- is tacit as well as explicit;
- is social as well as individual;
- is dynamic and cannot be reduced to an object, but is considered a ‘human factor’ (Wenger et al., 2002).

Knowledge construction includes the experience of meaning-making as the process by which we experience the world and our engagement with it as meaningful (Wenger et al., 2002). Choice and autonomy are important components of meaning-making (Cope & Kalantzis, 2013), and online learning activities and experiences are to be designed in such a way that promotes knowledge construction and transference across various authentic scenarios ranging in complexity (Kolb, 2014) .

Table 2.9: Definition of knowledge co-construction illustrates the importance of knowledge construction and transference to online learning.

Table 2.9: Definition of knowledge co-construction

KNOWLEDGE CO-CONSTRUCTION	Main contributors
<p>Definition</p> <p>‘Knowledge construction’ is the creation of knowledge, information exchange, and knowledge transfer that takes place within a context of interaction between human beings. When purposefully designing for interaction, the educational environment needs to be structured in such a way as to optimally support knowledge and information exchange.</p> <p>Rationale</p> <p>The online learning activities and experiences are designed in a way that promotes knowledge construction and transference across various authentic scenarios ranging in complexity.</p>	<p>Jonassen (1999)</p> <p>Ally (2007)</p> <p>Ertl (2010)</p> <p>Cope and Kalantzis (2013)</p> <p>Kolb (2014)</p>

Following is a diagram illustrating the preliminary framework for social networking and co-construction of knowledge that was derived to guide the research process (Figure 2.5: Preliminary framework for the study).

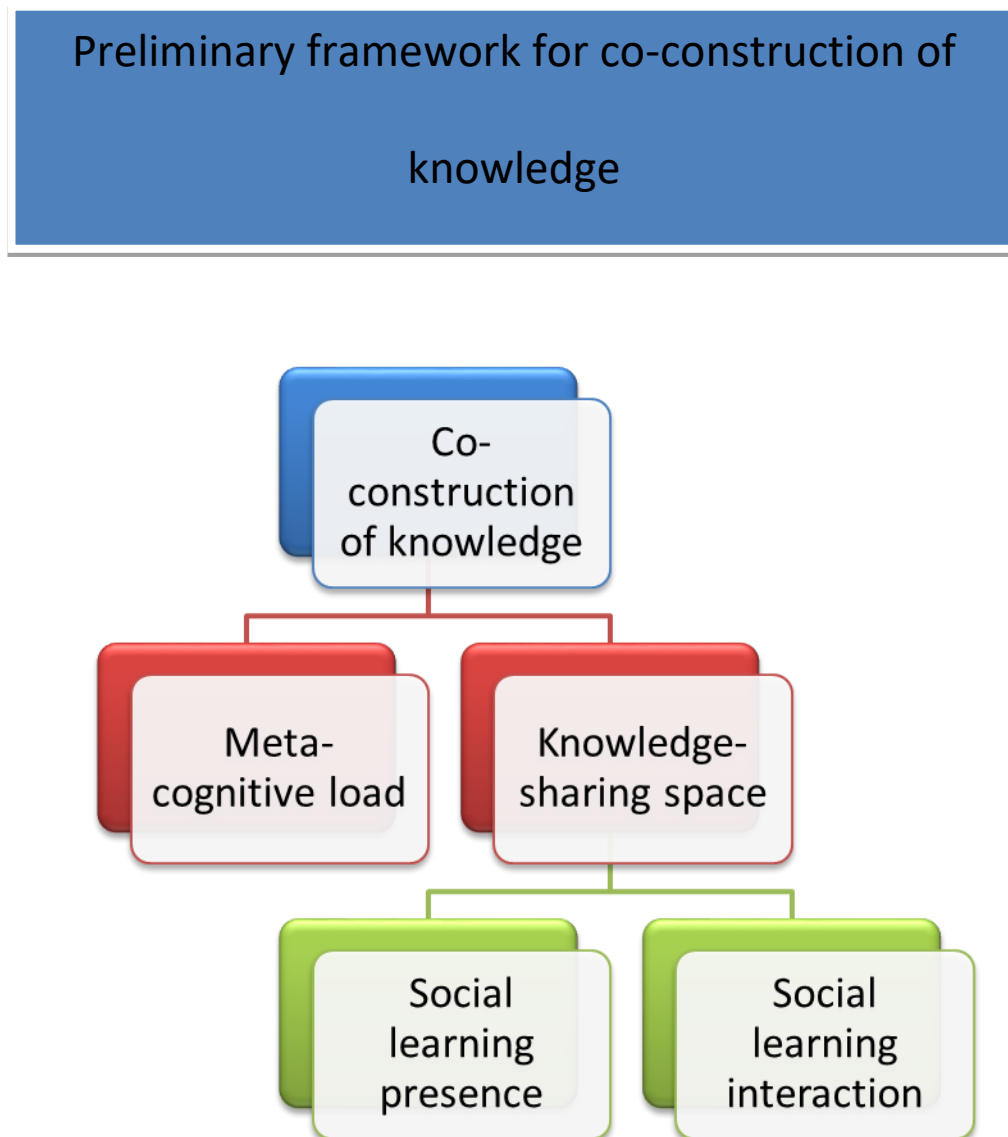


Figure 2.5: Preliminary framework for the study

2.17 Summary

This chapter reviewed how the educational landscape is changing to accommodate the way that people are interacting with technology, and usability factors need to include human beings within a specific context. There is a substantial body of knowledge concerning eLearning as an effective way to increase flexibility and access to tertiary education, and a growing body of knowledge for eLearning to be formalised for the Australian higher education sector. Learning theories relating to understanding the complex mechanism of learning contributed to instructional eLearning programs, such as the social learning approach and the design of social interaction. Important for this study, social constructivism declares that knowledge is acquired through collaboration with meaning negotiated from multiple perspectives.

Human-centred or user-centred design approaches, such as scenario-based design, participatory design and global/intercultural design, can complement the instructional design processes to encourage critical thinking, creativity and innovation. The challenge of eLearning environments is to create opportunities for interaction, such as learner-to-learner and learner-to-instructor exchanges, in such a way that deep learning processes may take place. Consequently, it is the aim of this study to find solutions in terms of learning design elements for social networking and the co-construction of knowledge within the eLearning arena.

Educational processes such as knowledge sharing, meta-cognitive load and knowledge construction are integral to constructivist instructional design. As this is a new field for instructional design that is less than 20 years old, there are minimal empirical studies for instructional designers and course developers to find a shared meaning and framework for the inclusion of these processes within complex and multi-layered eLearning modalities where more than one online collaboration tool is implemented.

CHAPTER 3 METHODOLOGY

3.1 Introduction

The methodology chapter details and justifies the research approach, methodology, data collection and analysis that were selected to conduct the study as considered fitting within the field of eLearning and instructional design. With the aim of exploring the learning design elements optimisation of social networking and the collaborative construction of knowledge, this research study employed exploratory sequential research within a mixed methods research design. This design was chosen as it enables both narrative data collection and numerical analysis to explore the learning design elements related to the proposed eLearning framework. The limitations of the methodology are also mentioned as restrictions on the generalisation of this study.

3.2 Pragmatism as research paradigm

In general, researchers in the social and behavioural sciences can be categorised into three groups (Teddlie & Tashakkori, 2009, p. 4), namely:

- **Quantitatively orientated scientists** primarily work within the positivist or post-positivist paradigm and are principally interested in numerical data and analysis.
- **Qualitative oriented social and behavioural scientists** primarily work within the constructivist paradigm and are interested in narrative data analysis (Lichtman, 2011).
- **Mixed method orientated scientists** present an alternative to quantitative and qualitative traditions by selecting and advocating the use of whatever methodological tools are required to answer the research questions under study and work primarily in the pragmatist paradigm interested in both narrative and numerical data analyses.

Mixed methods researchers select a design that best matches the research problem in order to make the study manageable and simple to implement and describe, and this aligns with pragmatism. Mixed methods research design involves not only collecting, analysing and interpreting both qualitative and quantitative data, but also integrating conclusions from both data sets into a cohesive whole (Leedy & Ormrod, 2013, p. 258; Teddlie & Tashakkori, 2009). A paradigm (e.g. positivist, constructivism, pragmatism) may be defined as a worldview, complete with the assumptions associated with that view (Mertens, 2003, p. 139). Pragmatism views knowledge as both constructed and based on the reality of the

world one experiences and lives in. Pragmatism as a research paradigm focuses on 'what works' as the truth regarding the research questions under investigation (Teddlie & Tashakkori, 2009, p. 8).

This research aims to investigate online learning elements that can contribute towards a framework to optimise learning within the Australian eLearning higher education context. The effectiveness of learning design elements for social networking and co-construction of knowledge against the perceptions of eLearning practitioners in the field of Australian higher education also needs to be validated. In order to achieve this outcome, a range of both confirmatory and exploratory questions are used in alignment with the mixed method tradition (Teddlie & Tashakkori, 2009).

3.3 Exploratory sequential research design

The researcher selected an exploratory sequential interpretation of the data within a mixed methods research design (Cresswell & Plano-Clark, 2011, p. 69) for investigation of the learning design elements focused on social networking and co-construction of knowledge. This type of mixed method approach utilises narrative data collection and numerical data analysis as conducted by this study. Mixed method research uses both deductive and inductive logic in a distinctive sequence described as the inductive-deductive research cycle or the chain of reasoning (Krathwohl, 2004). In sequential mixed designs, such as those employed by this study, the data collection techniques (e.g. the eDelphi expert panel and semi-structured interviews) of one strand emerge and are dependent on the next strand (e.g. the electronic survey) (Krathwohl, 2004). There are four basic mixed methods designs: the convergent parallel design, the explanatory sequential design, the exploratory sequential design and the embedded design (Cresswell & Plano-Clark, 2011). Exploratory

sequential research was chosen as an appropriate data collection, analysis and interpretation design to support the research process, as illustrated by Figure 3.1: Exploratory sequential design (Cresswell and Plano-Clark, 2011).

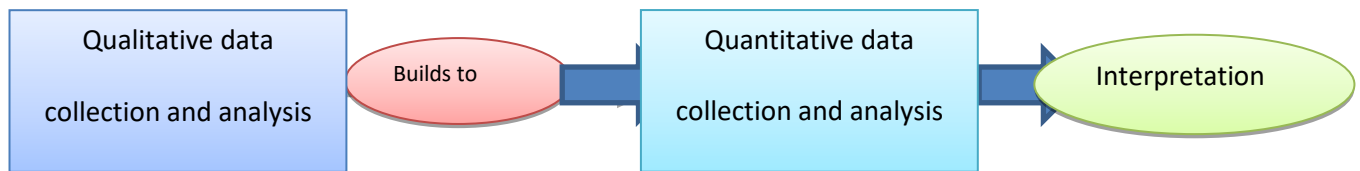


Figure 3.1: Exploratory sequential design (Cresswell and Plano-Clark, 2011)

The study started out by investigating the broad range of literature related to emerging trends within the field of eLearning and instructional design and strategies that support social networking and co-construction of knowledge.

The literature was focused on the Australian higher education sector as that is the context of the study. Opinions and feedback from an eDelphi expert panel and subsequent semi-structured interviews were employed to identify and explore critical learning design elements that support social networking and the co-construction of knowledge. This phase established the agreed upon definitions, rationale and review criteria for each of the learning design elements.

An electronic survey was sent out to a larger group of respondents to validate and improve the practical applications of the learning design elements to online and blended learning (Figure 3.2).

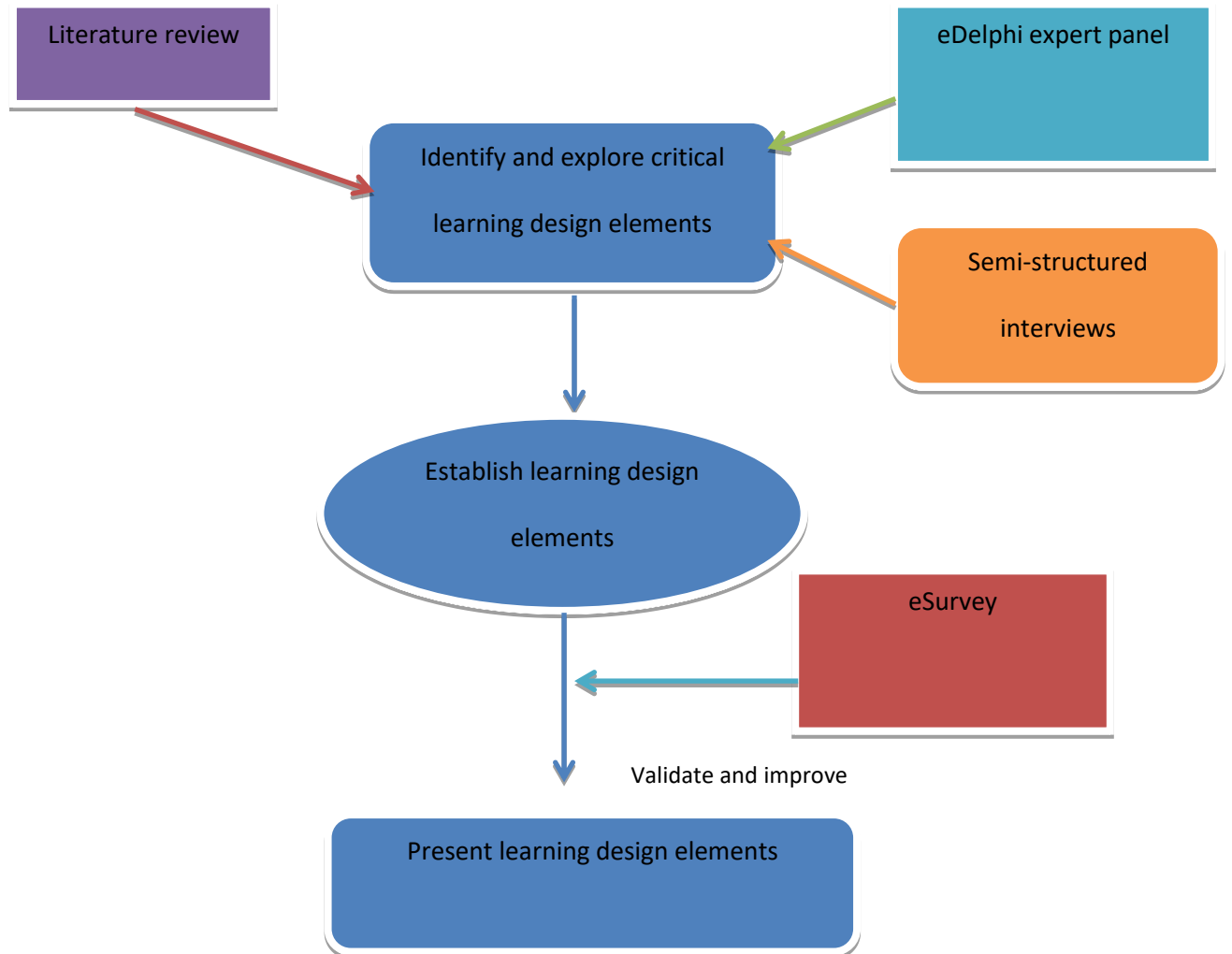


Figure 3.2: Exploratory sequential design applied to this study

The measuring scale for this study was the eDelphi expert panel discussion document (Appendix C), which was echoed by the survey instrument (Appendix H). The survey instrument in this instance was used to measure expert opinion, and the instrument therefore evolved over time. This posed certain reliability challenges, as the survey instrument by its very nature was changing and evolving with the research process, and

could not remain a static instrument to which the purist reliability standards could be applied.

3.4 Selection of the target population

The target population of the research study was experienced eLearning practitioners (instructional/educational designers, academic developers, online course coordinators, eLearning advisors) within the Australian higher education institutions that made use of eLearning, either on-campus or off-campus, as part of their learning design practice.

eLearning within the context of this study implies that students may be attending classes on campus (on-campus), be studying part-time (off-campus) or be studying fully online. Learning activities and assessments could be delivered by means of face-to-face, blended or fully online methods. The universities that were contacted employed all three of these delivery methods and used their learning management systems to allow students to access resources and instructor messages.

From a review of Australian higher education (*Higher Education funding in Australia*, 2015), the higher education sector in Australia is comprised of 37 public universities, two private universities and approximately 150 other providers of higher education. For the purpose of this research, one private university and 11 public universities were contacted. Sixty percent were also part of the Group of Eight, which is a coalition of leading Australian universities that are intensive in research and comprehensive in general and professional education (Bradley et al., 2008). The researcher started by identifying the teaching and learning support centres within the institutions, and located the people that worked in either instructional design or academic professional development within the capacity of eLearning practitioners.

A total of 12 ($n = 12$) Australian higher education universities were identified for the study, and 53 representatives from the various institutions were identified to participate in the study. This presented an average of 4-5 respondents per university selected by means of purposeful sampling.

3.4.1 Purposeful sampling

The researcher opted to purposefully select the target population based on subject matter expertise within the field of instructional design specialising in eLearning at Australian higher education institutions, even if this makes the sample less than fully representative. Purposeful sampling can be defined as a nonprobability sampling technique in which an experienced individual selects the sample based on his or her judgement about some appropriate characteristic required of the sample members (Zikmund, 2003, p. 385).

The target population was selected, not for demographic representativeness, but instead for the perceived subject matter expertise that they could contribute to the topic (Hatcher & Colton, 2007). The single most difficult problem with panel selection is deciding who is an expert (Rowe & Wright, 2011). Research bias may occur if the researcher relies on respondents who are available, or respondents whose reputations are known to the researcher. Respondents in general will also not be equally expert in all areas touched on by the questions (Murray, 1979). The researcher also relied on purposeful sampling by emailing invitations out to respondents not known to the researcher, in an attempt to reduce bias.

Participation in the study occurred on a voluntary basis, and initial selection subsequent to identification of individuals based on knowledge and skills was done by email invitation. The plain language statement, together with the informed consent form, was sent to respondents prior to data collection. The research data will be retained for 5 years upon

completion of the project, after which time paper records and electronic data will be destroyed in a secure manner. Only the researcher and the project supervisors have access to the personal information and raw data that could identify respondents.

All respondents met the following criteria:

- Employed at an Australian university that offers graduate programs online;
- Employed in the capacity of lecturer or instructional designer;
- Obtained a tertiary qualification, at a minimum;
- Engaged as a current instructional designer or academic teaching an online course and/or course coordinator of online graduate courses or programs; and
- Involved with course design, development, and/or coordination of online graduate courses.

Following is a more detailed explanation of the various steps within the research process.

3.5 eDelphi expert panel

The qualitative phase of the research, namely an eDelphi expert panel survey and semi-structured interviews, was aimed at reviewing the critical learning design elements derived from social constructivism that would support social networking and co-construction of knowledge. The purpose of the eDelphi expert panel was to elicit perceptions held by experts who are knowledgeable in the eLearning specialised learning design area (Vazques-Ramos, Leahy, & Hernandez, 2007). Panellists were typically selected, not for demographic representativeness, but for the perceived subject matter expertise that they can contribute to the topic (Hatcher & Colton, 2007).

Researchers (Chou, 2002) also suggest that the eDelphi expert panel must be selected from stakeholders who will be directly affected, experts with relevant knowledge and experience, and facilitators in the field under study.

3.5.1 The eDelphi technique

The Delphi technique was originally conceived by Linstone and Turoff (2011) as a 'method for structuring a group process' (p. 1714) and not necessarily to gain consensus. However, with increasing usage and modifications of the approach, there are now many different forms in existence, such as the modified Delphi, the policy Delphi and the eDelphi technique (Nowack, Endrikat, & Guenther, 2011). It is important to point out that not all Delphi techniques aspire to achieve consensus, for instance, the policy Delphi aims to support decisions by structuring and discussing the diverse views of the preferred future. Shelton and Creggham (2015) identifies the following basic characteristics of the Delphi technique:

- **Use of pseudonyms** that are not identified as being from specific members of the panel to allow for anonymity.
- **Controlled feedback** to allow interaction with a large reduction in discord among panel members. Interaction consists of allowing interaction among group members in several stages, with the results of the previous stage summarised and group members asked to re-evaluate their answers as compared to the thinking of the group.

The method is also advantageous when more individuals are needed than can effectively interact in a face-to-face exchange. It remains important that the heterogeneity of the respondents must be preserved to assure validity of the results, i.e., avoidance of

domination by quantity or by strength of personality (bandwagon effect) (Linstone & Turoff, 1975; Zeedick, 2010). Barriers to communication may include a reluctance to state unpopular views, to disagree with one's associates, or to modify previously stated positions (Hatcher & Colton, 2007). As the Delphi provides confidentiality, many barriers to open communication can be addressed. The statistical summary prepared after each round is used to develop the next round of questions and is issued as feedback so that respondents may revise their views through awareness of the overall process (Vazques-Ramos et al., 2007).

3.5.2 eDelphi method applied to this study

This study used the eDelphi method and an online survey application¹ as a mode for collecting data and communicating with the individual panel members. The LMS 'Moodle'² implemented as platform was an open-source software package that is gaining popularity within higher education institutions in Australia. The researcher selected Moodle for the eDelphi focus-group discussion as it offers a flexible online environment that supports a constructivist paradigm, and can present both content and asynchronous discussion facilities to the users (Zeedick, 2010).

An eDelphi focus-group discussion forum designed within a Moodle LMS was piloted to determine relevance and readability. The pilot study was included to provide valuable peer review feedback on the website, survey and discussion document. Linstone and Turoff

¹ Surveymonkey©, <http://www.surveymonkey.com>

² Moodle is available in more than 60 languages, and is used by over 5,000 known organisations worldwide including universities, schools, companies and independent educators (Dougiamas & Taylor, 2000).

(1975) claim that a small group of informed respondents (here, the panel's experienced practitioners) is more desirable than a larger group of uninformed respondents (random survey takers) and thus more capable of confronting a problem and coming to consensus. As noted by Graham (2010), the Delphi study panellists should meet four overarching criteria: (1) knowledge and experience with the issues under study; (2) the capacity and willingness to contribute to the investigation; (3) sufficient time for the study; and (4) adequate communication skills.

The respondents were contacted by email and asked to voluntarily participate in the study. Representatives from six institutions agreed to participate in the eDelphi forum, and five institutions took part in the semi-structured interviews. A total of nine ($n = 9$) respondents agreed to participate in the pilot study (17% of sample population). The preliminary eDelphi pilot study was conducted during September to October 2010. The eDelphi focus-group study was conducted from May 2011 to October 2011. A total of seventeen ($n = 17$) instructional designers and academic professional development personnel (32% of total sample population) subsequently participated in the eDelphi focus-group.

The researcher constructed a website to host the eDelphi discussion forum as informed by the literature review. This website was presented for peer-review and feedback. A pilot study served to prepare for an online focus-group discussion by the eDelphi expert panel. In related literature (Pollard & Pollard, 2005) the eDelphi research procedures typically consist of three or more discussion rounds to reach a general consensus. This process is typically conducted with paper and pencil. However, for the purpose of this study, email and online surveys were utilised. The steps of the eDelphi process were implemented as shown in Table 3.1.

Table 3.1: eDelphi process

eDelphi process	Description of research activity
1. Round one: Opinion poll	The <i>first questionnaire</i> was sent to the panel of experts asking for opinions involving experiences and a list of recommendations in terms of the proposed guideline document.
2. Round two: Opinion poll and discussion	On the second round, <i>a copy of the collective list</i> was sent to each expert and the experts were asked to rate or evaluate each item by some criterion.

The focus group discussion was aimed at evaluating, rating and rewriting the proposed instructional learning design elements necessary to facilitate social networking in online environments, including delivery modes of face-to-face, blended and fully online. Group discussion took place in an asynchronous³ web-based discussion forum. The results of the eDelphi-technique could be seen as ‘the product of a carefully designed and managed interaction and not answers to a set of abstract questions that are obtained by following prescribed methods’ (Pollard & Pollard, 2005, p. 148). Since the results of the eDelphi-technique are produced by structured interaction, the final product can be said to constitute a reality construct for the group.

³ The term ‘asynchronous’ means that online communication does not have to take place in a simultaneous time frame, and replies could be posted when convenient for the panel members (Schrire, 2006).

3.6 Semi-structured interviews

To corroborate the findings from the eDelphi technique, expert panel members were selected by purposeful sampling to participate in semi-structured interviews, conducted face-to-face, online (e.g. Skype) or telephonically depending on the geographic location and availability of the panel member. Interviews were aimed at collecting more in-depth qualitative data as well as to validate the findings from the eDelphi expert panel (Patton, 2002). Respondents took part on a voluntary basis. The plain language statement, together with the informed consent form, was sent via email to respondents prior to data collection. Ethical considerations of the research involved the use of standards tests administered appropriately to the normal adult population (over the age of 18).

The data was recorded and stored on the researcher's laptop only, in a manner (by RMIT University Ethical Research Code 1000073, 27 October 2009) such that for publication purposes the respondents were not identified (Appendix E).

Practitioners were viewed as instructional designers, educators or information technology specialists who were working within the field of the delivery of web-based education and concerned with related issues of HCI. The eLearning practitioners were asked to comment on the perceived usability of a set of learning design guidelines for eLearning that promote the use of emerging technologies for social networking and co-construction of knowledge (Appendix C).

3.6.1 Conducting the semi-structured interviews

As responses to emails proved to be problematic, the researcher phoned potential interviewees and explained the research study. Verbal communication via phone conversation allowed the development of rapport with respondents, which influenced participation decisions positively. In some instances, the researcher was referred on to another person within the organisation, who would be a suitable respondent, after she explained the research study on the phone.

Although purposeful sampling was the preferred method, this occurrence sometimes mimicked the snowball method of sampling (Zikmund, 2003), where respondents were referred and then contacted, rather than selected. The locations of the universities were spread across different states within Australia, namely Victoria (4 universities), New South Wales (1 university), South Australia (1 university) and Western Australia (1 university). As the researcher is located in Victoria, local interviews were conducted face-to-face and on location at the universities.

The New South Wales and South Australia interviews were conducted as telephone interviews, and the Western Australia interview was conducted via Skype. Skype is a free software application that supports video-conferencing which proved to be a very valuable method. Unlike a telephone interview, Skype allowed observation of facial expressions and gestures which added value to the interpretation of data activity (Richards, 2002). Semi-structured interviews may be viewed as restricting the flow of the conversation (Hrastinski & Aghaee, 2012). In this research, it was found that the questions helped to keep the conversation on track. The interview questions (Appendix G), consisting of an 11-item question guide, were designed to examine the answers to research questions by exploring

interviewees' professional experiences in designing for interaction and their perception of the identified categories.

Probing questions were prepared to identify additional exemplars, personal experiences, challenges and perceived obstacles. The interviewees were guided to talk about their learning experiences in the online course they were designing or developing. The researcher has a background in instructional design and eLearning; she often felt the need to constrain herself during the interview and not lean over to the role of consultant or respondent in the conversation, but rather remain focused on the respondent's experience or else the data collection would be biased.

3.6.2 The interview process

The researcher allowed for open-ended discussion at the end of the interview (question 11) and that served to include any further comments or issues that the respondent would like to raise. However, this question was only employed during two of the interviews, as by that time the discussion was mostly concluded.

The interview process was an active one, meaning that the researcher and interviewee created the data together (Holstein & Gubrium, 1995). This meant that she could draw upon her own experience in this area, however keeping the discussions within the limits of the focus of the interview (Seidman, 2006). The researcher found it important to also step back and listen with an open mind to the respondents, as this is a way to be open to the generation of new knowledge. The interviewees were guided to talk about their learning experiences in the online course they were designing or developing. The researcher identified broad categories during the first round of coding, and refined each category with further emerging themes upon the second iteration. All interview transcript analysis was

consistent with the constant comparative method (Lincoln & Guba, 1985; Strauss & Corbin, 1998).

The constant comparative method is an inductive data analysis, which uses the specific raw data of transcripts to generate abstract categories. The interviewees were very generous with sharing their time, knowledge and expertise during the interviews.

3.7 Electronic survey

In order to validate the findings, the researcher conducted an electronic survey with lecturers and tutors engaged with eLearning. An electronic survey is a survey in which a computer plays a major role in both the delivery and the collection of survey data (Jansen, Corley, & Jansen, 2007, p. 2). The three most common reasons for choosing an electronic survey (online survey) over traditional paper-and-pencil approaches are: (1) decreased costs, (2) faster response times, and (3) increased response rates. This survey research utilised electronic questionnaires to collect quantitative data from the sample population. Survey research allowed the researcher to summarise the findings of characteristics with different groups in order to evaluate respondents' beliefs and attitudes related to the research question (Fraenkel, Wallen, & Hyun, 2012).

Quantitative data examination utilises deductive reasoning to examine theories, employs standardised measurements and analyses numerical data (Fraenkel et al., 2012). Quantitative research methodology served to assist the researcher in ascertaining the solutions to research questions for evaluation of instructional guidelines for an eLearning framework that supports constructivist instructional design.

3.7.1 Constructing the eSurvey

An online survey was constructed using RMIT Qualtrics following the findings of the qualitative data analysis. This survey was distributed to academic practitioners in the field of eLearning and within the context of Australian higher education, following the same characteristics as the purposeful selection of sampling methods. The survey research utilised electronic questionnaires to collect quantitative data from the sample population. Survey research allowed the researcher to summarise the findings of characteristics with different groups in order to evaluate respondents' beliefs and attitudes related to the research question, namely to interrogate learning design elements for eLearning that promote the use of emerging technologies for social networking and co-construction of knowledge (Fraenkel et al., 2012). This survey contained 21 items, which were divided to test a number of variables for each item. The independent variables in this study were: (i) gender; (ii) age; (iii) employment position; (iv) highest level of education achieved; (v) geographic location; and (vi) years of experience in online higher education. The dependent variables were: (i) online facilitation tasks; (ii) student engagement; (iii) student collaboration; and (iv) organisational support (Appendices H and I).

3.7.2 Designing the instrument

The qualitative data served to produce descriptions and criteria for the use of the learning design elements. However, how each of these learning design elements is used within the realm of online/blended higher education is vague. The survey questions were identified in accordance with the description and criteria of the learning design elements, as summarised by Appendix I. The examples contained in the survey questions were drawn from data collected by the semi-structured interviews as documented in Chapter 5.

3.8 Limitations of the methodology

3.8.1 Representation

As the study was focused on Australian higher education, it was contextualised, and further research would be required to confirm transferability to other sectors of education such as primary and secondary education. The locations of the universities were spread across different states within Australia, namely Victoria (4 universities), New South Wales (1 university), South Australia (1 university) and Western Australia (1 university). The results and findings of this study cannot be generalised or seen as representative of all Australian educational institutions as Australia is comprised of 37 public universities, two private universities and approximately 150 other providers of higher education.

3.8.2 Judgement

Researchers Bolger, Stranieri, Wright and Yearwood (2011 [a]) found that confidence alone will not be a strong indicator of panellist expertise in a certain area. Rather the degree of opinion change was relative to the degree of support received by other panellists. The eDelphi expert panel was conducted fully online, which may have hindered the degree of support received by the panellists.

3.8.3 Reliability and validity

This study made use of exploratory sequential research design, and the analysis and findings of the study were mainly exploratory and qualitative by nature. Regardless of what research design is adopted, attention to rigour throughout the process is a vital aspect of research. Structured feedback that was statistically summarised within iterative rounds of the eDelphi panel enabled the collection of data to analyse that was dependable and confirmed (Murray, 1979).

The use of random purposeful sampling further increased the credibility of the study. Validity of this research study is ensured through the heterogeneity of the panel members selected (Linstone & Turoff, 1975). While respondents were familiar with instructional design in graduate-level online education, the interviewees had differing points of view and perspectives, which contributed to the consensus-building process (Zeedick, 2010).

The electronic survey instrument by its very nature was changing and evolving with the research process, and could not remain a static instrument to which the purist reliability standards could be applied.

3.9 Summary

Mixed methodologists present an alternative to quantitative and qualitative traditions by selecting and advocating the use of whatever methodological tools are required to answer the research questions under study, and usually operate within the pragmatist paradigm.

Exploratory sequential research design was chosen as it supports the way the investigation of the central research question was conducted, namely employing narrative data collection and numerical data analysis. The data collection methods were aimed at gauging the effectiveness of the learning design elements to support social networking and co-construction of knowledge in order to create a framework for optimised eLearning within the Australian eLearning higher education context.

Expert panel members from Australian higher education institutions were purposefully selected and specifically invited. Semi-structured interviews were aimed at collecting more in-depth qualitative data as well as validating the findings from the eDelphi expert panel. An electronic survey research utilised online questionnaires to collect quantitative data from a broader selection of the target population to validate the results. Analysis and findings of the study are discussed in Chapters 4, 5 and 6.

CHAPTER 4 IDENTIFY LEARNING DESIGN ELEMENTS FOR SOCIAL NETWORKING AND CO-CONSTRUCTION OF KNOWLEDGE

4.1 Introduction

Chapter 4 provides the analysis and findings of the first phase of the research process, namely the eDelphi expert panel. The purpose of the eDelphi panel was to evaluate a draft guide of learning design elements that would guide development of a framework to contribute towards the use of emergent technologies.

The profile of the respondents includes instructional/educational designers, academic developers, online course coordinators, eLearning advisors and a quality manager for distance learning. The majority of the respondents held 8-15 years of experience within eLearning in a higher education setting within Victoria, Australia. This chapter discusses the sampling, results and findings from the eDelphi expert panel survey as related to the learning design elements required for online student networking and knowledge construction.

4.2 Demographics of the eDelphi expert panel

The eDelphi expert panel discussion took place in a pre-constructed web-mediated environment, as next described. Figure 4.1: eDelphi focus-group discussion illustrates the interface of the Moodle website that was designed for the eDelphi focus-group discussion.

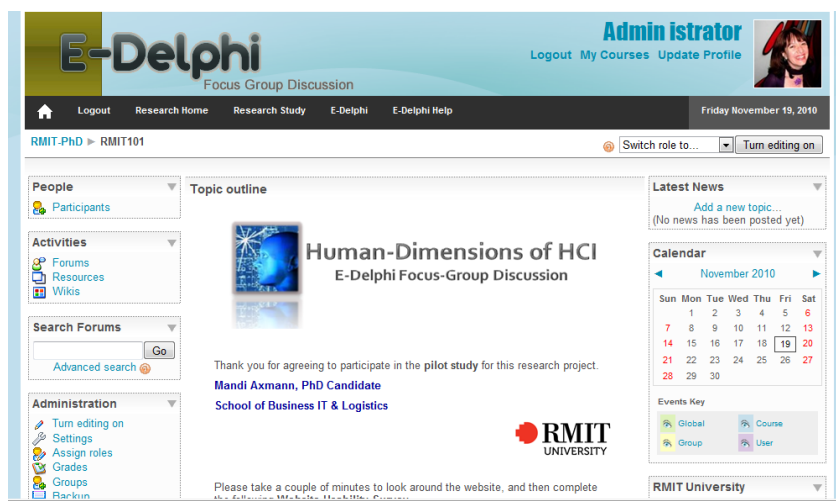


Figure 4.1: eDelphi focus-group discussion

A total of 53 ($n = 53$) instructional designers and academics that adhere to the selection criteria were contacted by means of email. Seventeen (17) respondents agreed to the study, resulting in a response rate of 32%.

There were only a few more female (ten females, 58%) than male (seven males, 41.1%) panel members who agreed to participate in the research study. A total of eleven panel members held Master's degrees in a relevant field of education or educational design, and three panel members had PhD qualifications. Two panel members held honours degrees, and the remaining one respondent was currently completing a PhD qualification.

Six panel members (35.3%) had 3-7 years' experience in online higher education, and five panel members (29.4%) held 8-15 years' experience. Two panel members were employed for 16 or more years (11.7%). The remaining four panel members were in their roles for 2-4 years (23.5%). Table 4.1 summarises the demographic distribution of the respondents.

Table 4.1: Demographic details of the respondents

Ref. no.	Pseudonym	Position within organisation	Gender	Age group	Years in current role	State in Australia
1.	Sally	Senior lecturer in academic development	Female	50-54	2-4	New South Wales
2.	Frank	Instructional designer	Male	40-44	8-15	New South Wales
3.	Jill	Online learning course coordinator	Female	30-34	3-7	New South Wales
4.	Mary	Academic professional developer	Female	35-39	2-4	South Australia
5.	John	Instructional designer	Male	50-54	16+	South Australia
6.	Sarah	Academic manager for online programs	Female	45-49	3-7	Victoria
7.	Kate	Instructional designer	Female	35-39	3-7	Victoria
8.	Joan	Instructional designer	Female	40-44	8-15	Victoria
9.	Michael	Senior lecturer in adult education	Male	55-59	16+	Victoria
10.	Freda	Associate lecturer in academic development	Female	45-49	8-15	Victoria
11.	Allan	Instructional designer	Male	50-54	8-15	Victoria
12.	Wesley	Educational designer	Male	30-34	2-4	Victoria
13.	Maria	Instructional designer	Female	30-34	3-7	Victoria
14.	Brett	Quality manager for distance learning	Male	45-49	3-7	Victoria
15.	David	Academic (online learning program)	Male	40-44	3-7	Victoria
16.	Anna	eLearning advisor	Female	25-29	2-4	Western Australia
17.	Patricia	Online learning course coordinator	Female	35-39	8-15	Western Australia

It may be concluded that the majority of panel members were well-qualified practitioners with experience in online higher education and thereby could contribute a professional and expert opinion.

4.3. Results and findings

Each of the learning design elements was allocated review criteria that described how this element presented within an online learning environment. The review criteria served to further define and describe how the learning design element could be used to support student collaborative activities and social networking (Appendix C).

4.3.1 Findings related to social learning presence

A high percentage of panel members (64.7%) rated the review criteria for social learning presence as critical, and a further 11.8% rated it essential that the online learning activities promote meaningful instructor-student and student-student interactions that allow students to engage in a learning community, as shown in Figure 4.2.

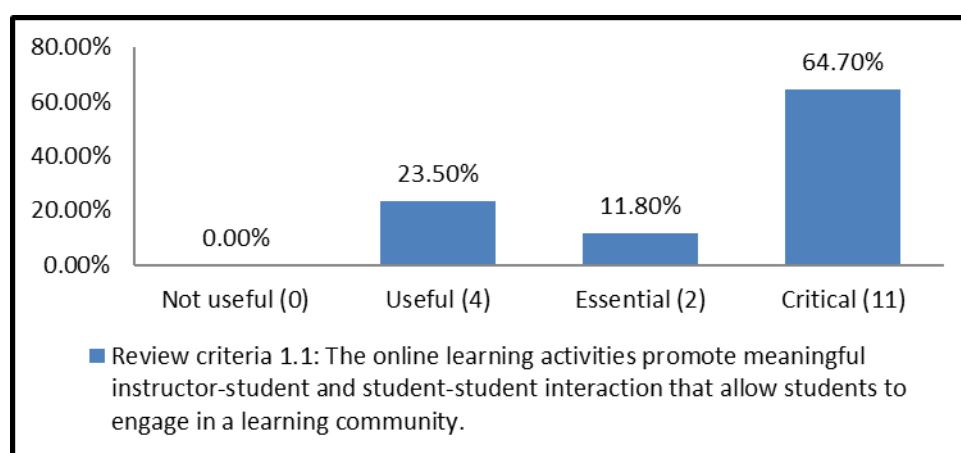


Figure 4.2: Panel members' ratings for social learning presence, review criteria 1.1

Online study is often a convenient way for people from a variety of backgrounds (e.g. mature age, working, postgraduates) to study as it offers opportunities to study at times, spaces and places that suit them (Barnes, 2012). Joan (instructional designer, 8) and Wesley (educational designer, 12) agreed that to develop a learning community requires that learners are there for a common purpose, e.g. undertaking a particular course. However, the demographics of online learners indicate that they are an increasingly diverse range of people effectively from anywhere in the world (Rennie & Morrison, 2013).

The creation of knowledge, information exchange and knowledge transfer take place within a context of interaction between human beings (Clark & Mayer, 2008). When purposefully designing for interaction, the educational environment needs to be structured in such a way as to optimally support a common purpose despite diversity (Allen, 2003; Ally, 2007; Merrill et al., 2008). More than half of the panel members (70.6%) were of the opinion that the web-based course design should allow opportunities for students to interact socially with each other in the online environment, as shown in Figure 4.3.

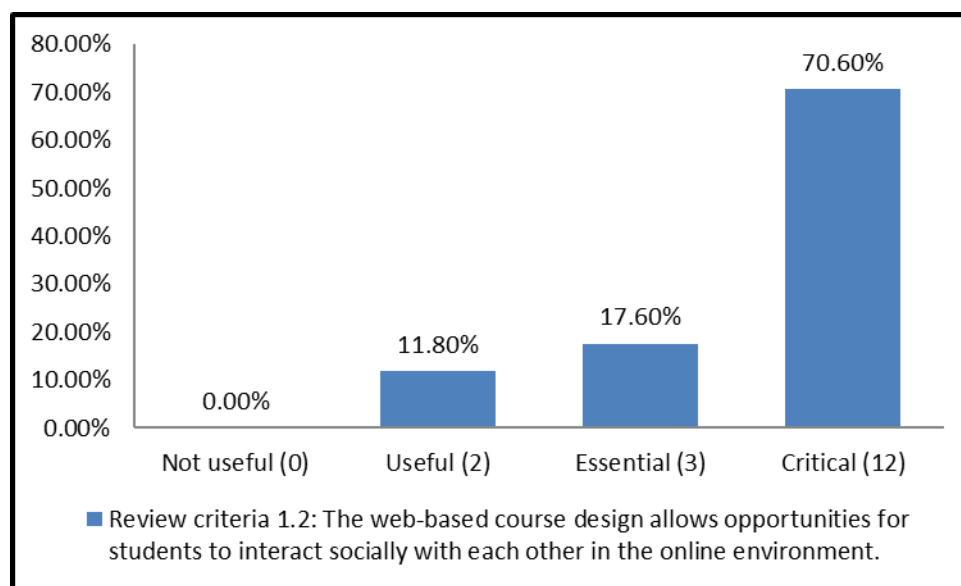


Figure 4.3: Panel members' ratings for social learning presence, review criteria 1.2

Frank (instructional designer, 2) observed that a lack of sense of trust in the environment, whether technological or interpersonal, may adversely affect group dynamics, and that reasons need to be created for students to socialise:

‘A lack of meaningful reasons to interact can exist within the course (especially socially e.g. focus on getting qualification, not ‘making new friends’).’

Wesley (educational designer, 12) cautioned that it needs to also be considered that many students are time poor and have existing social networks, and that design should acknowledge and incorporate rather than ignore this. Wesley (educational designer, 12) stated that learners can support each other in their learning through curricula activities, e.g. contributions to a wiki.

Just less than half of the panel members (47.1%) felt it critical that the online learning activities provide opportunities for students to reflect socially and affectively on their learning progress, as illustrated by Figure 4.4.

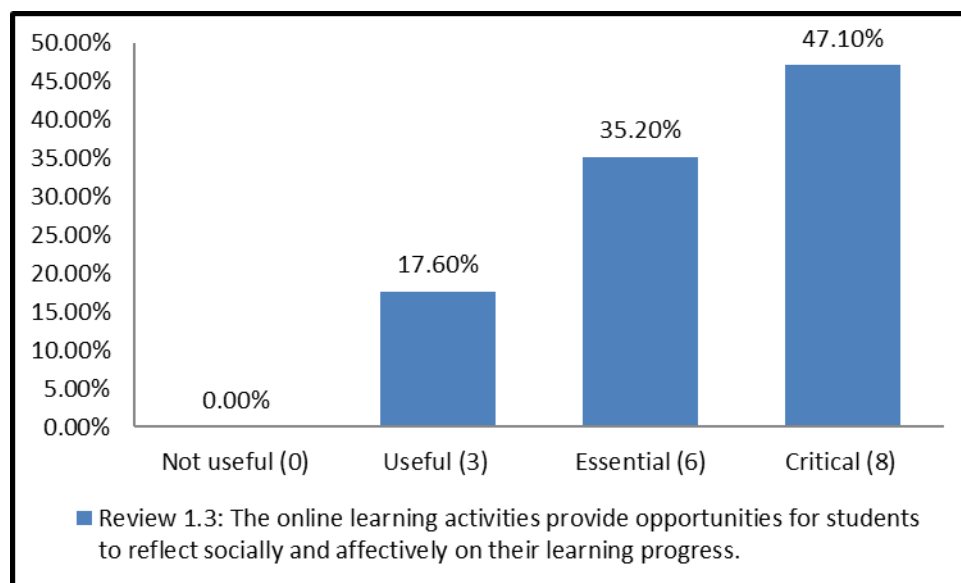


Figure 4.4: Panel members' ratings for social learning presence, review criteria 1.3

Mary (academic professional developer, 4) remarked that a very diverse student cohort, especially if no effort is made to find similarities, and the differences in time and time zones may all affect social learning presence. Student cohorts sometimes do not want to interact online, especially with distance subjects, unless it is part of a summative assessment.

Within the learning design there may also be a lack of opportunity to feel part of the learning group and environment (Cheung & Vogel, 2013). Mary (academic professional developer, 4) also remarked that heavy content with little opportunity to interact with others will further adversely affect social learning presence. Michael (senior lecturer in adult education, 9) cautioned that social learning was not necessarily seen as part of the academic context, stating:

‘My personal observations are that students like to keep their social and learning contexts separate.’

Jill (online learning course coordinator, 3) agreed that it was critical that educational design promoted meaningful interactions between facilitators and students, and allowed people to interact socially if they wish. Caution was raised that merely creating opportunities for socialisation does not mean that students will develop online social relationships. As online social presence cannot be assumed or left to chance, the researcher concluded that it is deemed as necessary to include the criteria, namely that the online learning activities provide opportunities for students to reflect socially and affectively on their learning progress. This can provide further opportunities for learners and educators to recognise the importance of social learning presence.

4.3.2 Findings related to social learning interaction

Social learning interaction refers to how the online learning interaction supports and contributes to the creation of a social learning system. Most panel members (70.6%) indicated it as useful to provide students with online opportunities for mutual engagement in a coordinated effort to solve problems together (online collaboration). However, panel members did not agree that this was a critical review criterion for socio-cognitive interaction (17.6%), as set out in Figure 4.5.

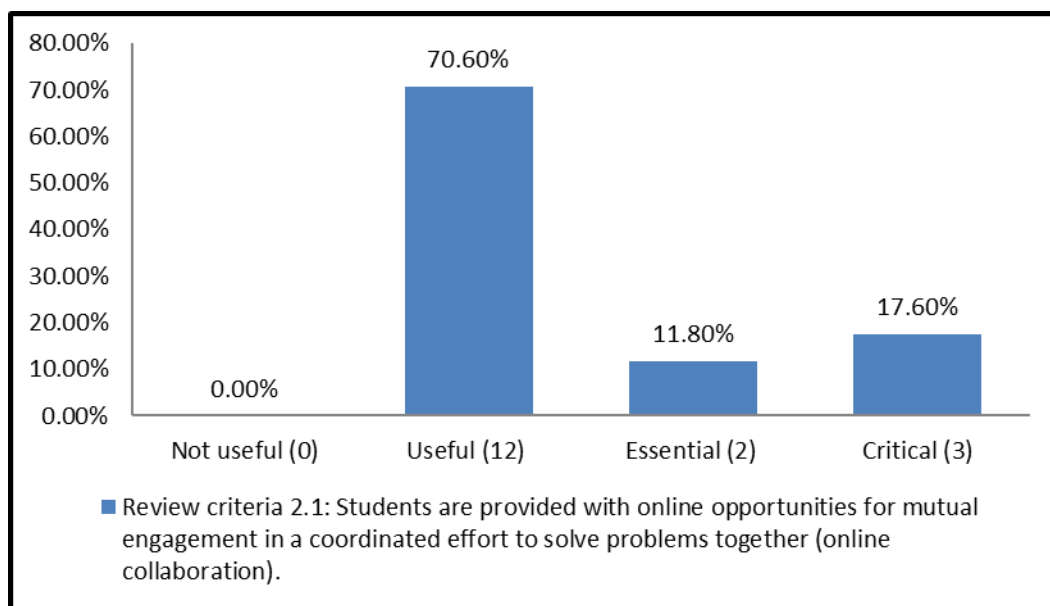


Figure 4.5: Panel members' ratings for social learning interaction, review criteria 2.1

Students are encouraged to assume responsibility for their own learning, effective collaboration and meaningful engagement as well as constructive solutions to real-life problems. Social constructivism perspectives on knowledge creation state that all knowledge is created socially (i.e. within groups) within a context (Francisco, 2013).

Kate (instructional designer, 7) and Anna (eLearning advisor, 16) were of the opinion that giving students opportunities to co-construct their learning, extend their understandings of concepts and develop meta-cognition skills within their domains is essential (Waycott, Gray, et al., 2010). However, it is also essential that students are given opportunities to internalise their learning in order to be able to share or articulate it back and thus further refine as more learning occurs (Waycott et al., 2013).

Findings from a study investigating students' satisfaction within eLearning courses (Strong et al., 2012) indicate that the environment was based on six constructs: 1) instructor support; 2) student interaction and collaboration, 3) student autonomy; 4) authentic learning; and 5) personal relevance and active learning. Instructor support ($M = 4.28$, $SD = .63$), student interaction and collaboration ($M = 4.16$, $SD = .79$) and student autonomy ($M = 2.92$, $SD = .53$) received the highest scores for eLearning environment. These aspects of human behaviour influence the design of an online learning system that can respond to the emotional and social aspects of user behaviour.

Students continue to rely on materials provided by lecturers, and only a few students gained a sense of themselves as emergent authors (Thompson, Morton, & Storch, 2013). John (instructional designer, 5) commented that within the learning environment it needs to be made clear that individual opinions are valued and contribute to other students' understanding of the content. A learning environment needs to encourage interaction amongst students so that learning experiences are embedded throughout the design of the subject (Barnes, 2012). Therefore, students should be encouraged to assume responsibility for their own learning, effective collaboration and meaningful engagement, as well as creating constructive solutions to real-life problems (Almala, 2006).

Bradley (2010) cautions that the presence of communication technology tools alone does not assure collaboration and construction of new knowledge, and it needs to be purposefully designed within the learner pathways.

Secondly, important for eLearning, social constructivism declares that knowledge is acquired through collaboration with meaning negotiated from multiple perspectives (Almala, 2006) and therefore included to support social networking. However, just over half of the panel members (52.9%) viewed it as essential and 41.1% saw it as critical for students to be able to share their individual perspectives on learning problems within the online group discussion. Findings correlated with the pilot study, namely that it seems that panel members rate individual student contribution as more critical than collaborative activities, as shown by Figure 4.6.

This finding may correlate with one of the misconceptions about authentic learning, namely that students cannot perform complex and authentic tasks until they have been taught the sub-skills to complete them (Herrington et al., 2010). It may also be that it is difficult to assess individual student performance and contributions based on a collaborative task (Hrastinski & Aghaee, 2012).

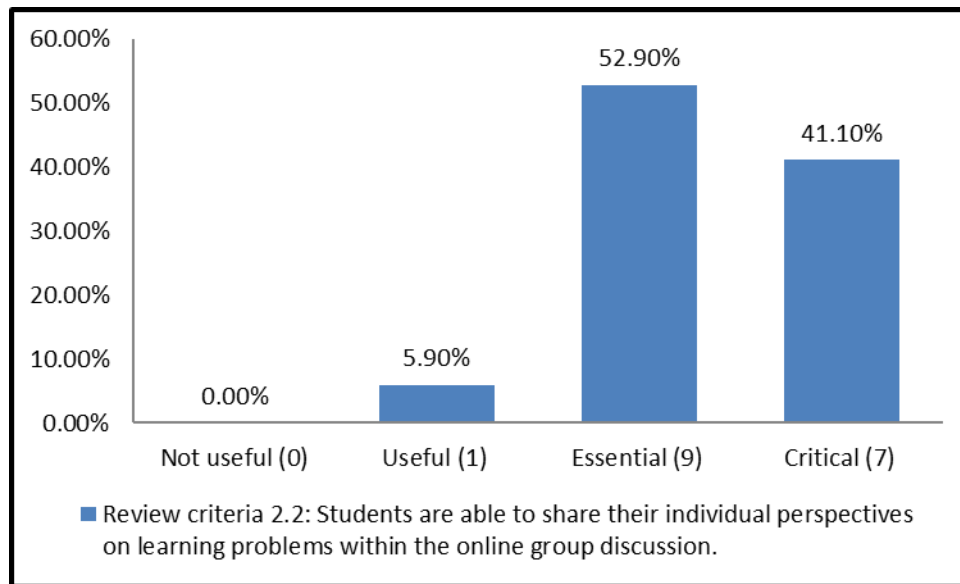


Figure 4.6: Panel members' ratings for socio-cognitive interaction, review criteria 2.2

David (academic, online learning programs, 15) commented that Bloom's taxonomy of knowledge, comprehension, application, analysis, synthesis and evaluation, as revisited by Anderson and Krathwohl (2001), is an excellent framework for designing learning activities and assessments to be delivered as part of the online learning process. Therefore, giving students opportunities to individually develop these specific levels was essential. Suggestions for online collaboration provided by Maria (instructional designer, 13) can be summarised as follows:

- Provide meaningful activities, with or without the need to collaborate;
- Set guides, examples for cognition, e.g. reflection template;
- Provide support for learners with differing abilities to participate/contribute;
- Set clarity of expectations and shared goals;
- Provide context for why students are part of this group, and set some clear criteria or social interaction 'rules'.

Sally (senior lecturer in academic development, 1) observed that a mix of individual and group assessment tasks allows for socio-cognitive development. Reflective tasks (e.g. blogs) and group tasks (e.g. wikis) could be used to cater for this development (Waycott, Gray, et al., 2010). Freda (associate lecturer in academic development, 10) also provided feedback that the term for the learning design element 'social learning interaction' should replace the term 'socio-cognitive interaction', which was implemented during the second iteration of this process.

4.3.3 Findings related to knowledge-sharing space

Knowledge-sharing space refers to how the online learning design is maximised to allow for sharing and distribution of knowledge in a safe space. Knowledge-sharing space is viewed as a mostly useful, essential and critical activity. It appeared that panel members rated higher the individual contribution of students (70.6% critical) as opposed to the collaborative activities of interacting, building relationships and a sense of belonging (58.9% critical), as illustrated by Figure 4.7.

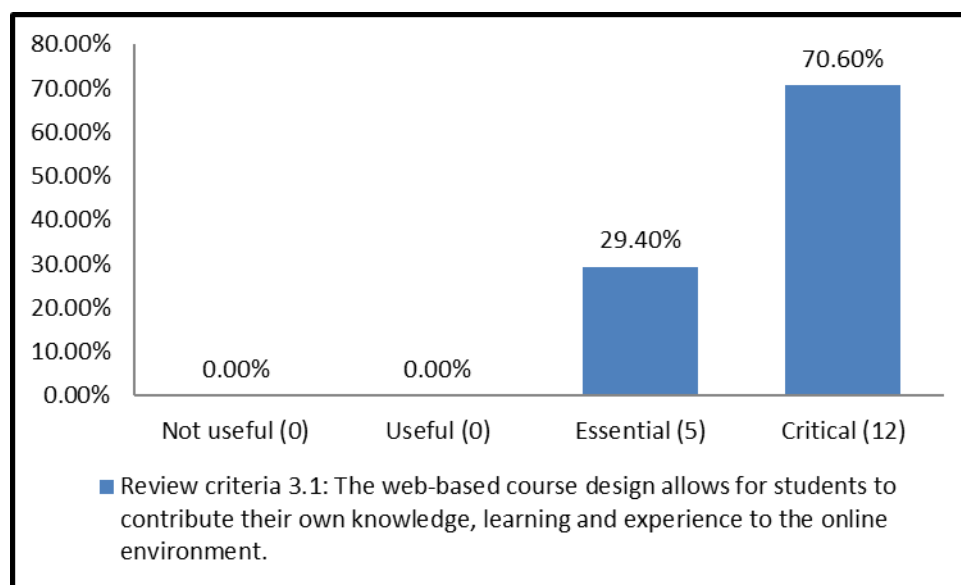


Figure 4.7: Panel members' ratings for knowledge-sharing space, review criteria 3.1

Panel members rated as critical (58.9%) and essential (41.1%) that online learning activities create opportunities for students to interact, learn together, build relationships and develop a sense of belonging and mutual commitment, as shown by Figure 4.8.

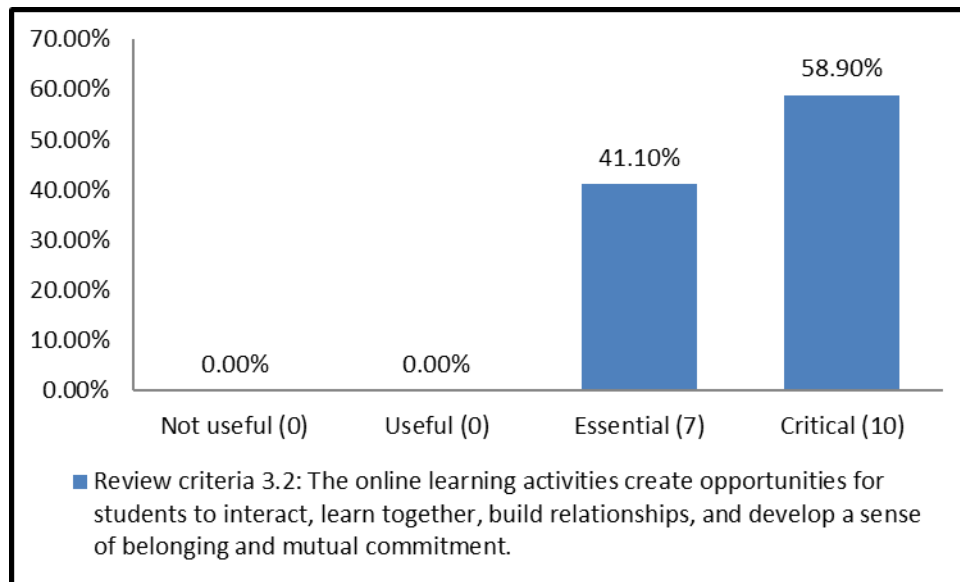


Figure 4.8: Panel members' ratings for knowledge-sharing space, review criteria 3.2

Just over half the panel members (52.9%) rated as critical that the online learning events provide students with opportunities to construct social meanings and vocabulary by means of cross-cultural sharing, as shown by Figure 4.9. Allan (instructional designer, 11) suggested that in the future the semantic web may create new possibilities for connecting ideas and information using social media.

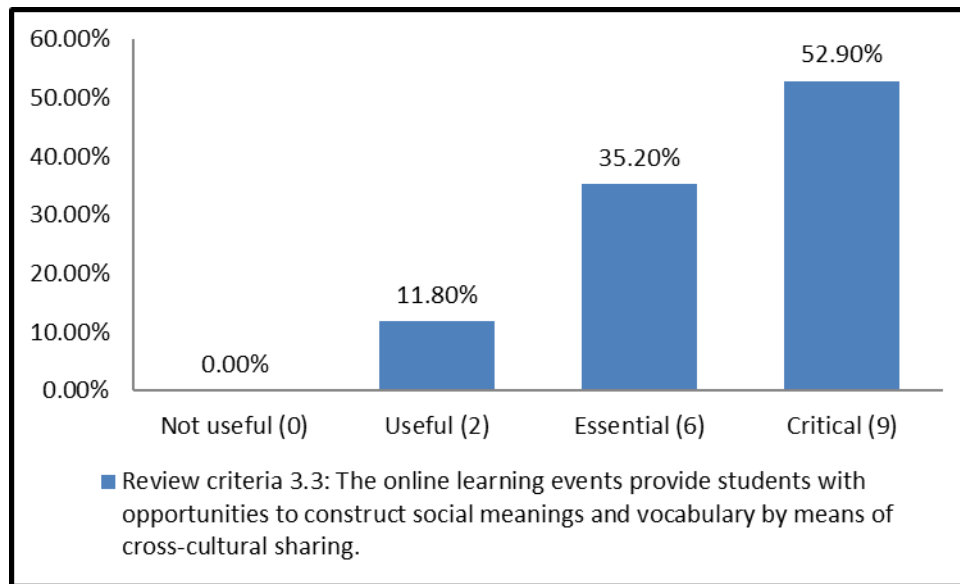


Figure 4.9: Panel members' ratings for knowledge-sharing space, review criteria 3.3

Patricia (online learning course coordinator, 17) remarked that students need to protect their intellectual property and ideas need to be acknowledged as an inhibiting factor to knowledge sharing:

'Fear of being ripped off, no clear incentive to share, no protection of intellectual input is a key factor in inhibiting knowledge sharing.'

Often time poor factors mean that academics end up delivering resource based learning. This may also act as an inhibitor to developing a space where students feel safe to share. Constructivism maintains that educators craft learning experiences into an active, experiential process in which learners create new ideas and think through problems. The review criteria 'knowledge-sharing space' is defined as how the online learning design is maximised to allow for sharing and distribution of knowledge in a safe space. Advanced technology provides valuable tools to design and develop eLearning environments using a constructivist approach (Almala, 2006; Jonassen, 2005).

As the global economy expands, cross-cultural experiences generated by working virtually in teams increase in frequency. Everything has to have a purpose, especially if students are time poor. Assessment is a key driver for getting students to complete learning activities (Smith, 2005). While allowing students to self-monitor themselves is useful, most won't do this as they have not learnt to be reflective or they cannot see the relevance of the learning outcome.

4.3.4 Findings related to meta-cognitive load

The sequence and progression of the online learning experience in support of meta-thinking refers to meta-cognitive load. Meta-cognitive load activities such as online opportunities for self-monitoring, goal setting, problem-solving and self-reward were valued highly by a large percentage of panel members (47.1% essential and 23.5% critical), as illustrated by Figure 4.10.

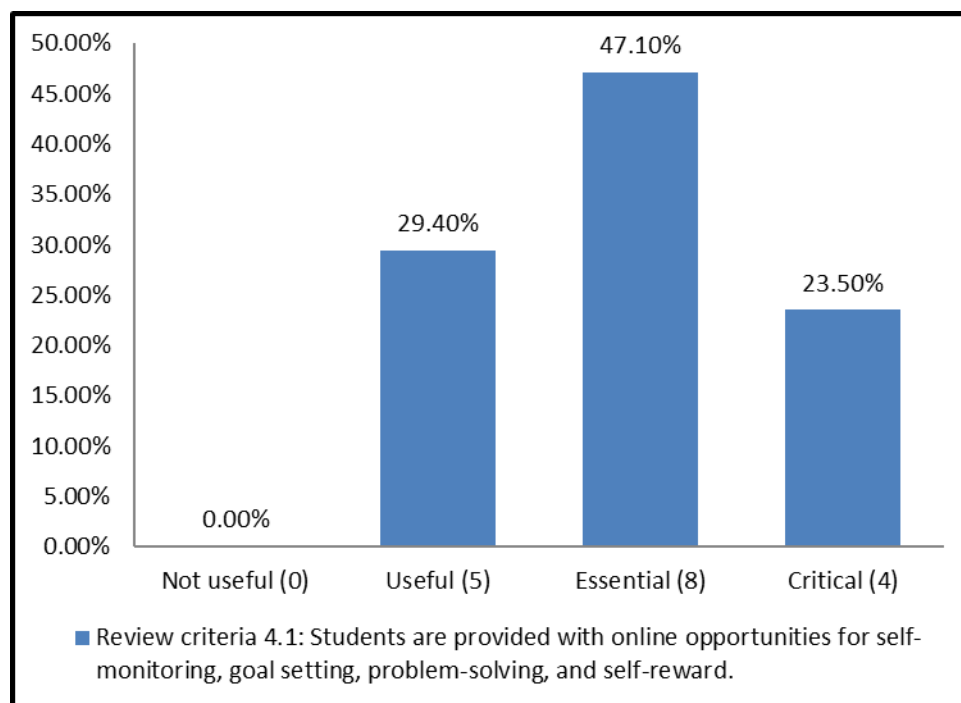


Figure 4.10: Panel members' ratings for meta-cognitive load, review criteria 4.1

There is a strong need for active, enquiry based learning that fosters 21st century employability skills in graduates (Fraser, Richardson, & Karpathiou, 2014). Brett (quality manager for distance learning, 14) agreed that in the knowledge economy, workers need high level meta-cognitive skills that allow thinking, analysing, problem-solving, research and evaluation. The storing and processing of complex information in cognitive operations, also known as higher level thinking (L. Anderson & Krathwohl, 2001), are rated lower by most panel members (58.9% essential and only 17.6% critical), as shown by Figure 4.11.

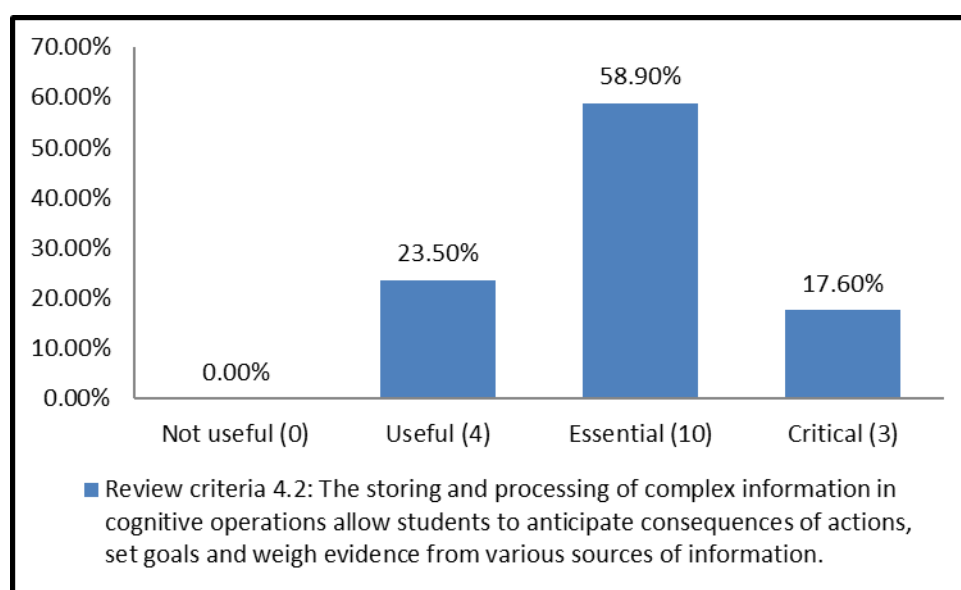


Figure 4.11: Panel members' ratings for meta-cognitive load, review criteria 4.2

Joan (instructional designer, 8) suggested that providing space for students to think through difficult concepts was found to be essential to any educational environment. Allan (instructional designer, 11) commented that student motivation and the relevance of the learning task also need to be considered.

Integral to the constructivist process is the development of students' critical thinking skills, problem solving and team skills, experiential learning and interdisciplinary knowledge (J. Bradley, 2010). Constructivist learning environments enable learners' social and meta-

cognitive skills to develop and are designed to promote students to collaboratively generate flexible, creative solutions to situations. Instructional cognitivist paradigms encourage learners to use meta-cognitive skills to help in the learning process (Ally, 2007). The online learning activities and experiences ought to be designed in such a way that promotes knowledge construction and transference across various authentic scenarios ranging in complexity (Henderson et al., 2015).

There is an inherent tension that remains between the learning design, the learning process and the use of the technology (Pitman, 2013). Students and the learning process can be frustrated if the technology is not applied appropriately to task, or if the learners do not have access to appropriate infrastructure or are not skilled in using the technology (Oreilly et al., 2010).

4.3.5 Findings related to knowledge construction

The online learning activities and experiences are designed in a way that promotes knowledge construction and transference across various authentic scenarios ranging in complexity, for example, case studies, scenarios and hands-on experiments. Higher-order thinking processes and deep learning occur when students are offered the opportunity to participate in social construction of knowledge (Jonassen, 2005; Smith, 2005).

The majority of panel members agreed that the online learning events need to allow students opportunities to create new knowledge by using appropriate cognitive processes or by using discipline knowledge for a new purpose, which will improve their ability to exploit existing knowledge (41.1% as useful, 35.2% as essential). These results are illustrated by Figure 4.12.

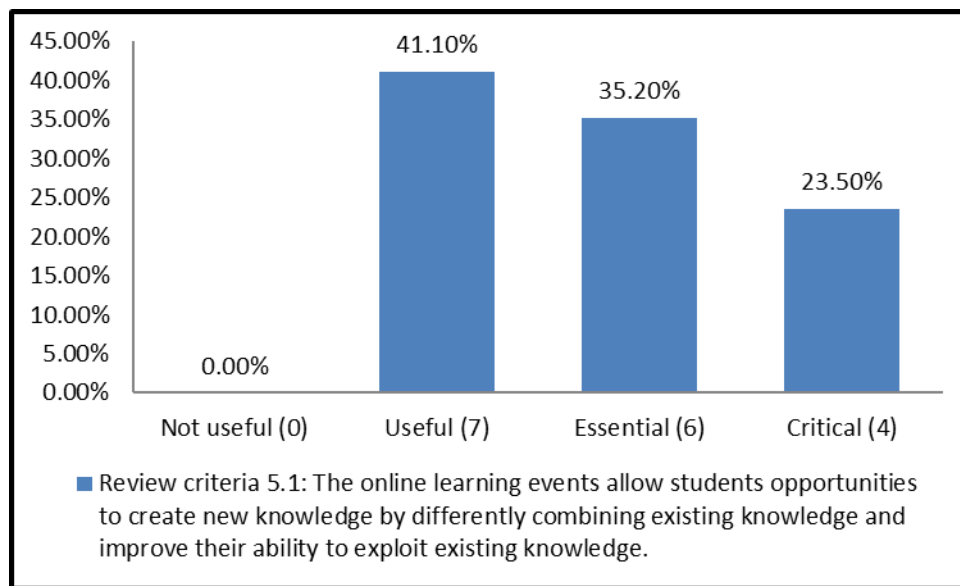


Figure 4.12: Panel members' ratings for knowledge construction and transference, review criteria 5.1

Most panel members (70.6%) found it essential that the online learning design contains pathways that enable students to identify existing and accessible knowledge, in order to transfer and apply this knowledge to solve specific tasks more efficiently and effectively. This notion also complies with 'constructive alignment', which proposes that the learner constructs his or her own knowledge through relevant learning activities. The educator's task is to create a learning environment that structures the learning activities and learner pathway in such a way that this knowledge construction may be achieved (J. Biggs, 2003). Further comments by Sarah (academic manager for online programs, 6) included that the review criteria was not always easy to understand, and that too much 'jargon' may have affected the responses.

Not all panel members were in agreement (rating of 17.6%) with review criteria 5.2, namely the online learning design enabled students to identify existing and accessible knowledge. Identification of knowledge was an essential component of the transfer process and

necessary to apply the knowledge to solve specific tasks more efficiently and effectively. Use of existing knowledge for a new purpose was found to be important to collaborative knowledge construction, as shown in Figure 4.13.

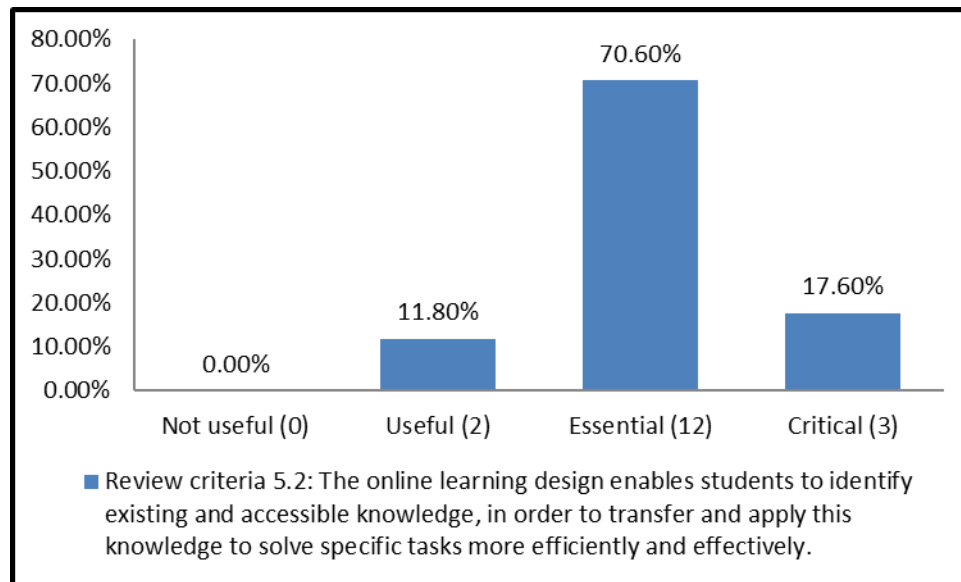


Figure 4.13: Panel members' ratings for knowledge construction and transference, review criteria 5.2

A possible reason why this criteria was not rated very highly as critical (17.60%) is that a clear understanding of exactly what is meant by 'new knowledge construction' is not agreed upon by constructivist theorists (Hung, Lim, & Jamaludin, 2011). New knowledge may refer to integration of a new idea, concept or skill (Cope & Kalantzis, 2013), but it can also be gaining insight into the meaning or understanding of a familiar concept in a new way (Biggs & Tang, 2011). It is also complex to assess exactly how much 'new knowledge' a student has gained during the learning process. Kate (instructional designer, 7) argued that learning outcomes and assessment need to be mapped across the curricula and the program.

Gradually increasing the level of meta-cognitive complexity of learning tasks to meet the learning outcomes and aligned incrementally staged assessment tasks would allow students to develop knowledge, skills and abilities in a scaffolded and connected manner, not dissimilar to Vygotsky's Zone of Proximal Development (Vygotsky, 1978). Constructivist alignment systematically aligns the learning and teaching tasks to the assessments and the intended learning outcomes (Biggs & Tang, 2011). It is important also to structure the learner pathway such that the complexity of tasks increases. Just over half of the panel members (52.9%) were of the opinion that it is critical for online learning activities to present students with different authentic scenarios and situations to apply and evaluate their acquired learning, as set out in Figure 4.14.

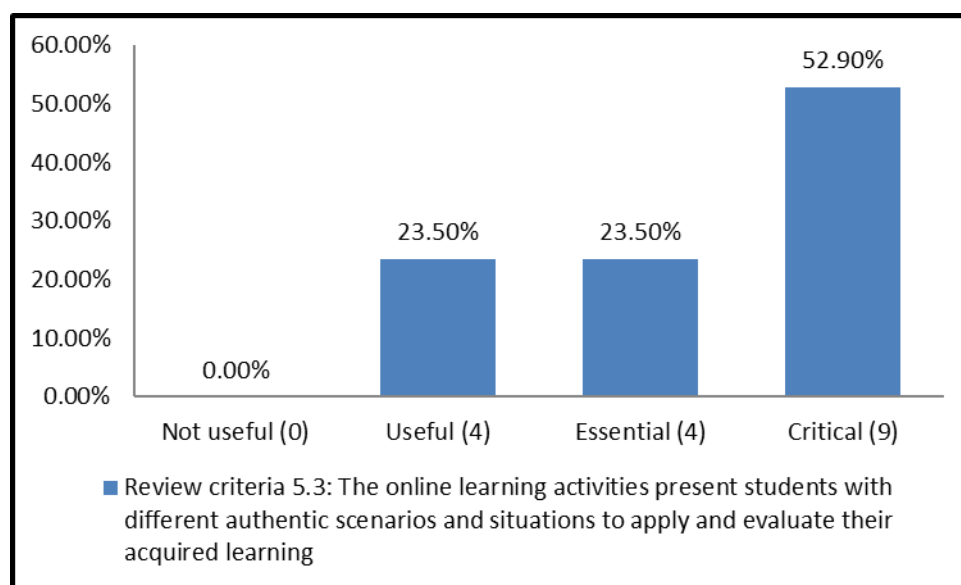


Figure 4.14: Panel members' ratings for knowledge construction and transference, review criteria 5.3

Anna (eLearning advisor, 16) remarked that there was too much emphasis placed on students' capacity to find information rather than the critical thought that has to be applied to determine if the sought data or information is pertinent to addressing the task at hand.

Frank (instructional designer, 2) noted that programs also need to look at how eLearning programs present a more holistic experience for students, and that there is a need for students to retain access to their learning products after completion of the course:

'One of the issues I have with LMSs is that students generally get access to a classroom for 6 months, then it's archived and it disappears. This model segments learning experiences. A student-owned space that students access throughout their studies, e.g. an ePortfolio, would allow more of a holistic educational experience.'

Active engagement through participation and educational design is critical to learning (Lauwers, 2010). Design of the learning activities, delivery choice for resources and assessments and the online facilitator or tutor impact on a successful online environment (Kolb, 2014). Purposeful design, also known as instructional or educational design, is aimed at constructing eLearning environments in such a way that optimal learning, including generic skills development, may take place (Dick & Carey, 2006; Ellis et al., 2007; Merrill et al., 2008). Prior knowledge is a key factor in the acquisition of new knowledge, because it allows for integration as well as transference of existing knowledge. However, learners should be able to choose the eLearning procedure that fits with their existing individual knowledge (Ertl, 2010). The emergence of disruptive technologies, such as mobile learning and Web 2.0 technologies (Cochrane, 2008), also serves to facilitate the move from cognitive pedagogies to social constructivist pedagogies. Engaging the students as active respondents in education provides a richer environment more conducive to student-centred learning (Zeedick, 2010).

4.4 Summary

The eDelphi expert panel discussion took place in a pre-constructed web-mediated environment, and a total of seventeen (17) respondents agreed to participate. The majority of panel members were well-qualified practitioners with experience in online higher education within the Australian context, and were therefore able to provide an expert opinion on the selected learning design elements.

The main findings highlighted how important it is that the web-based course design allows opportunities for students to, in the first instance, be present online and then engage in the learning activities evidenced by social interaction. As online social presence cannot be assumed or left to chance, and the online learning activities should provide opportunities for students to demonstrate reflection on their learning progress.

Panel members rated individual student contribution as more critical than collaborative activities. The learning environment needs to encourage interaction amongst students so that learning experiences are embedded throughout the design of the subject, and reflective tasks (e.g. blogs) and group tasks (e.g. wikis) could be used to cater for this development (Waycott, Bennett, et al., 2010). Too much emphasis is often placed on students searching for information without enough critical thought having to be applied to determine if it is appropriate. The eDelphi expert panel raised some critical issues that were explored in more depth during the analysis of the semi-structured interviews presented in Chapter 5.

CHAPTER 5 FURTHER EXPLORATION OF LEARNING DESIGN ELEMENTS

5.1 Introduction

The second phase of the qualitative data collection consisted of in-depth, semi-structured interviews to further interrogate learning design elements where inconsistencies were found when the initial responses were analysed during Chapter 4.

The profiles of the interviewees included an academic manager for online programs, instructional/educational designers, senior and associate lecturers in adult education, eLearning advisors and academic development professionals, with the majority situated within Victoria, Australia. This chapter provides the analysis and findings of the coded data inductively derived from the semi-structured interviews. Coding of the transcripts generated further categories. The findings are set out as an exposition of the main themes collated from the interview data collection process.

5.1.1 Demographics semi-structured interviews

The interviews were conducted from November 2011 to June 2012. Ten separate interviews were conducted with an average time of 40 to 60 minutes each. Each interview was audio recorded and later transcribed. The researcher found it a valuable exercise to transcribe the interviews. She heard nuances and identified themes during the transcribing of the interviews that she did not when she first conducted the interviews.

The demographics of the interviewees are summarised in Table 5.1.

Table 5.1: Demographics of interviewees

Ref. no.	Pseudonym	Role within organisation	Gender	Age group	State in Australia	Date and time of interview
1.	Aileen	Academic manager for online programs	Female	45-49	Victoria	8/11/2011 2:50-3:40 pm
2.	Barbara	Instructional designer	Female	35-39	Victoria	14/11/2011 10:30-11:30 am
3.	Deborah	Instructional designer	Female	40-44	Victoria	14/11/2011 2:00-3:15 pm
4.	Fred	Senior lecturer in adult education	Male	55-59	Victoria	18/01/2012 10:30-11:30 pm
5.	Mary	Associate lecturer in academic development	Female	45-49	Victoria	15/12/2011 2:00-3:40 pm
6.	Michael	Instructional designer	Male	50-54	Victoria	28/01/2012 10:00-11:00 pm
7.	Roger	Educational designer	Male	30-34	Victoria	1/02/2012 2:00-3:00 pm
8.	Sally	eLearning advisor	Female	25-29	Western Australia	1/12/2011 5:00-6:20 pm
9.	Sarah	Senior lecturer in academic development	Female	50-54	New South Wales	14/04/2011 2:00-3:40 pm
10.	Michelle	Associate lecturer in academic development	Female	55-56	South Australia	16/06/2012 2:00-3:00 pm

The researcher started out by asking the interviewees to describe their role and experience with online learning as guided by the preliminary categories set out in Table 5.2. This helped also to relax the tone of the interview, and to establish rapport (Richards, 2002).

Table 5.2: Preliminary categories for semi-structured interviews

Number	Category
1.	Role and experience
2.	Perceptions of the human-dimensions of eLearning
3.	Experiences with social media
4.	Perceptions of instructional guidelines
5.	Challenges for designing for social interaction within eLearning
6.	Additional comments

During the interviews the researcher emphasised repeatedly that respondents should share their own words, ideas and opinions, and that comments were not required to be based on academic literature or research. This encouragement was important as all the respondents were working within the field of higher education, and often academic development, and would be very familiar with current research.

5.1.2 Coding of data sets

The inductive coding of the data sets took the form of successive iterations involving the procedures based on Lincoln and Guba's techniques of unitisation and categorisation within the software program Nvivo (Richards, 2004). The iterations were repeated until no new patterns emerged (Chen et al., 2011). Source codes refer to the number of times a category was coded into a specific theme, as summarised in Table 5.3.

Table 5.3: Summary table of categories and source codes

Category	Source codes
Terminology confusion	7
Perceived elements of human-dimensions within eLearning	
1. Learning activities and interactivities	15
2. Social communication	8
3. Collaboration	7
4. Diversity	6
5. Fears	5
6. Student-lecturer relationship	4
Instructional guidelines considered as most important when designing for online social interaction	
7. Authentic, meaningful and relevant instruction	15
8. Conscious modelling of behaviour	10
9. Rules for engagement	8
10. User-centred design	7
11. Spontaneous design	6
Design challenges for online social interaction	
12. Organisational impact of including social media tools	6
13. Alignment of technology and learning outcomes	3
14. Lack of feedback and evaluation of eLearning programs	3

Data collection and analysis continued until the categories were saturated (i.e. definitions of categories were well defined and no new information was uncovered) to ensure further validity and reliability of the qualitative data sets. The interviews provided a wealth of in-depth information, and it was a challenge to know which of the data to leave out and what to focus on.

The findings for this specific study need to be centralised around the main research question, namely to investigate and subsequently identify guidelines for learning design elements within a constructivist instructional design (C-ID) approach. The study was guided by the literature review and eDelphi expert panel findings to provide a focus for the reporting of the findings.

5.2 Perceived elements of human-dimensions within eLearning

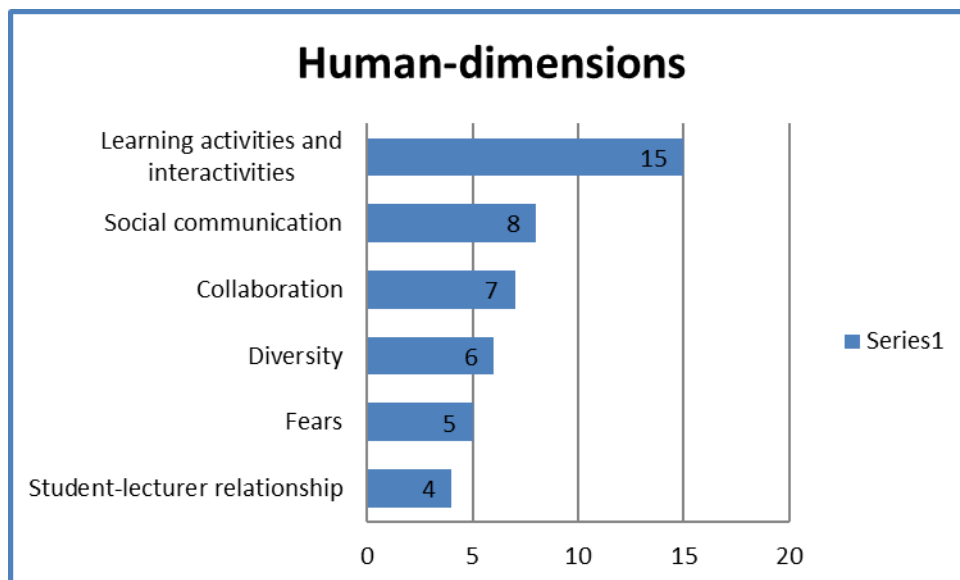


Figure 5.1 depicts the perceived elements of eLearning as categorised by the data coding process. The elements identified are in order of source codes, namely how many references were made to each of the perceived elements of human-dimensions within eLearning: (i) learning activities and interactivities; (ii) social communication; (iii) collaboration; (iv) diversity; (v) fears; and (vi) student-lecturer relationship.

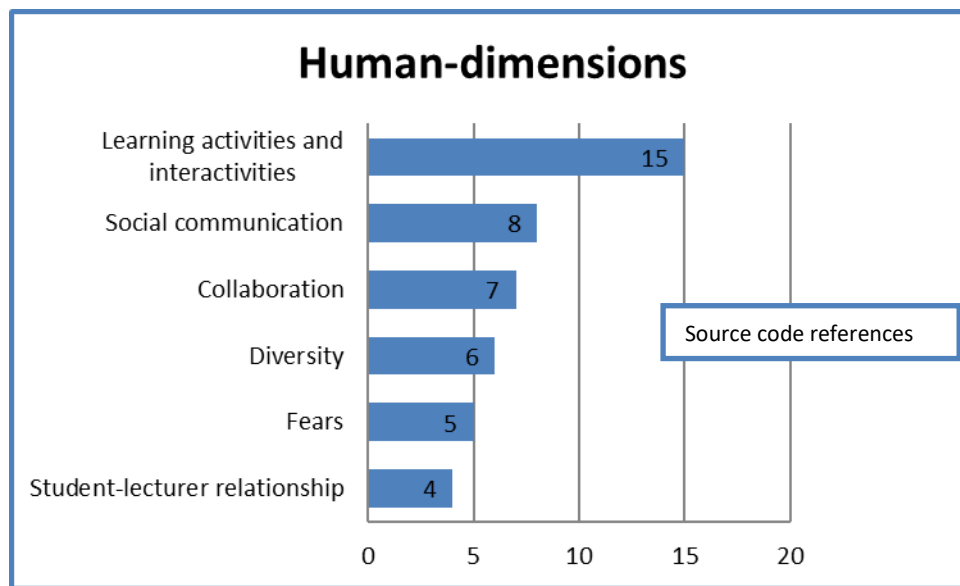


Figure 5.1: Perceived elements of human-dimensions within eLearning

Deborah (instructional designer, 3) designs online learning courses to meet objectives that have already been identified by the client (lecturer). She viewed her job as turning content into something that works in an online learning format.

Deborah's perception of attributes of an eLearning space was that it could be a lonely and isolated place for both learners and academics:

'I guess ... I picture the person who is sitting at the computer and how they might interpret what it is that they are reading and seeing and feeling as they are working on their own – I see them being on their own ... my interpretation of them is actually fairly isolated, and probably lonely. It is how I picture the person.'

Purposefully designing for social interaction may address this 'picture of the lonely person', but there are many factors to be taken into account when doing so. Not all people find the use of computers intuitive and phobia may inhibit the use of technology (McKay, 2008). This becomes an important component to consider when designing for online social interaction.

5.2.1 Learning activities and interactivities

Instructional designers employ learning activities and interactivities to create a learning pathway for students (Oreilly et al., 2010). Usually these activities are structured around the learning outcomes and course content, and aim to prepare the student for assessment tasks. Learning activities are, for example, case studies and journal entries, while interactivities are exemplified by work and peer evaluation (Lauwers, 2010).

Within an eLearning course, the learner is required to interact with the content, other students, and the teaching staff while doing these activities and this becomes the process dimension of the learning taking place. Sarah (senior lecturer in academic development, 9) conducts research investigating integrating technologies into the curriculum and associated policy development, and how to set up effective and sustainable learning environments.

Sarah (senior lecturer in academic development, 9) described the human-dimensions of the 'human' and how the person or learner interacts with those environments. This interaction with the various learning environments dovetails with the social constructivist philosophy that guided this study. This philosophy assumes that the creation of knowledge, information exchange and knowledge transfer take place within a context of interaction between human beings (Clark & Mayer, 2008). Referring back to studies investigating undergraduate generic skill development (Badcock et al., 2010), teaching and learning activities need to be purposefully designed (Palmer & Holt, 2012). The challenge of eLearning environments is to create opportunities for interaction such as learner-to-learner and learner-to-lecturer exchanges in such a way that skills development can take place. Purposefully designing these learning activities is not always a straightforward process.

Mary (associate lecturer in academic development, 5) facilitates professional development sessions with academic staff and also support staff. Mary observed this obstacle when talking about her own experience when taking an online learning course. She experienced some of the activities as contrived, and she felt under so much pressure and did not want to put all of her thoughts into a public discussion space every time she submitted something:

'It was very uncomfortable for me and I did not enjoy the learning experience.'

When designing a learning environment, the learning outcomes and content usually take the primary focus, and the activities and interactivities a secondary focus. But, if students have a negative experience such as Mary (associate lecturer in academic development, 5) described, it can impact adversely on student motivation and ultimately student retention. She stated that the human-dimensions of interaction should predominate the design of online learning, and her perception of the human-dimension in online teaching and learning is that it's inseparable:

'The human aspect of it for me cannot be separated out from any of the online teaching and learning – I think it should predominate and drive the design of online teaching and learning.'

In summary, the elements of the human-dimensions within eLearning relate primarily to the communication that takes place within this environment. The learning activities that are presented need to take into consideration aspects such as diversity, fears and the relationships surrounding the activities, and not merely the learning content and learning outcomes.

5.3 Social communication

The main obstacles for implementing social media are the rapidly evolving and changing nature of social media applications, suitable devices and student usage patterns. The average lecturer or academic may struggle to keep up-to-date with rapidly evolving social media and may consider technology as an obstacle due to time constraints. A research report by the eLearning research guild investigating social media for learning (Bozarth, 2011) found that for both work and personal use the most popular tools were video sites like YouTube, followed by professional networking sites such as LinkedIn, BranchOut, Spiceworks and Biznik.

As of July 2011, the most common uses of social media in eLearning were facilitation of learning communities, followed by delivery of courses with social-media collaboration, and delivering stand-alone content. An impressive 83% of the panel members (n = 792) felt that social media has value for learning. Social media is the collective of online communications channels dedicated to community-based input, interaction, content sharing and collaboration. Websites and applications dedicated to forums, micro-blogging, social networking, social bookmarking, social curation, and wikis are among the different types of social media (Cope & Kalantzis, 2013). When working with social media that is available within the latest versions of LMSs such as blogs, wikis, ePortfolios and virtual classrooms, a host of new opportunities for social interaction become available within eLearning.

Aileen (academic manager for online programs, 1) described an instance when she was teaching a design unit for information technology and she took a photo of an automatic self-check booth at the airport. Aileen posted that photo of the self-check booth on the

discussion board within her eLearning course. She then conducted an asynchronous discussion on design accessibility and every-day objects. The students were required to take and upload their own photos and post stories of counter-intuitive designs. The students went on to spontaneously organise their own synchronous chat forums around the topic so the learning activity was deemed a success. Aileen (academic manager for online programs, 1) reported that both she and the students had tremendous fun with the activity, and it contributed to the overall student engagement with the subject:

'The students themselves were very engaged in that area – the synchronous activity created that because I don't think with the discussion board alone you would have gotten that level of interaction – because the discussion board is so fragmented.'

Aileen's (academic manager for online programs, 1) story raised an important question that was shared by many of the interviewees. The experience emphasised several unanswered questions in relation to how much of the social media needs to be designed into the learning activities in a course, and how much should be left to students to personalise and construct their own social interaction environments. Barbara (instructional designer, 2) at the time of the interview was working on a large-scale international project between Australia and China. The project involved using print-based existing resources as a basis for an eLearning solution that would be able to accommodate a very diverse cultural audience. Barbara (instructional designer, 2) was of the opinion that lecturers and students needed to be allowed to use technology that they were most comfortable and familiar with:

'And I think sometimes teachers will use the social media that they are comfortable with, and that their students are comfortable with. Therefore it makes sense that they use those ones, not the social media that I've designed or forced them to say – well here is this forum, go discuss in there, while they would prefer to Tweet to each other.'

There appears to be value in allowing for both synchronous as well as asynchronous forms of interaction. Whilst some students preferred to work by themselves in their own time schedules, synchronous communication adds another opportunity layer to social interaction.

A study that was conducted by Wang (2014) to establish the trust building factors in online learning environments found that the course instruction dimension was rated 10% higher than privacy and security dimensions. The social and course design factors (e.g. reputation, design quality, and instructor socio-communicative style), when used effectively, can help overcome students' privacy and security concerns for operating efficiently in an online course.

Mary (associate lecturer in academic development, 5) observed the importance of Elluminate sessions⁴ as an opportunity for students to express and verbalise their ideas:

'Incorporate then also the opportunity for speaking to each other, for example, Elluminate sessions or however you could do that, to give people the opportunity to verbalise their thoughts and actually learn and think by talking rather than just committing it to written text.'

Synchronous activities may also provide a platform for first-year student socialisation and learner engagement, as Aileen (academic manager for online programs, 1) further reflected during the interview. She also found that in terms of socialisation in first year units, online students enjoy being able to talk to someone:

⁴ Elluminate is now also known as Blackboard Collaborate and is a software application that allows for video and audio streaming presentations with multiple users.

‘They are very keen to meet other students – and that’s because most are new back to learning, and a fair proportion of them are new to learn remotely – and we can also say that there is this social capability.’

In conclusion, social communication refers to the changing patterns of social media applications within eLearning programs.

The general perception is that lecturers and students need to make use of the technology they are comfortable with, and that is a best fit with the learning task. Incorporating both synchronous and asynchronous forms of online communication adds value and a deeper relationship dimension to the eLearning program or course.

5.3.1 Collaboration

The assessment of collaboration, team work and group work is often fraught with difficulties (Su & Beaumont, 2010). However, when interviewees related their success stories, many respondents commented on the successful use of collaborative work within eLearning courses. Michael (instructional designer, 6) is employed in the science, engineering and health portfolio. His role is to assist academics and teachers to prepare materials suitable for online delivery, particularly when the Blackboard classroom first arrived at his university.

Over the years with the introduction of new technologies, he encourages academics and teachers to use these technologies and facilitate their uptake. He provides academics with training, professional development and support. Michael (instructional designer, 6) described a wiki project⁵ where students had to build up their knowledge base on a specific subject area. The wiki received a very good response from the students, who reported that it was innovative, different and stimulating:

⁵ Wiki is a tool for collaboration and group work within the learning management system. Within the wiki students build up their learning and understanding, and that becomes the focus of the technical learning.

‘And because they don’t have lectures and they don’t have tutorials, they can nevertheless talk amongst themselves and share things, and they all do a little different set of material so focus on it. They got to do their own work.’

Mary (associate lecturer in academic development, 5) was also involved with a successful collaborative wiki project within the department of architecture (Osman-Schlegel, Fluker, & Cheng, 2011). Mary explained that the lecturer used the wiki for students to collaborate in groups. The course had 180 registered students, who were divided into 18 groups of 10. The students were to present two of their assignments in the form of a MediaWiki as all of their collaboration was in the MediaWiki.

Mary (associate lecturer in academic development, 5) maintains that the use of wikis was successful as students had to do all of their discussion for their team meetings in the wiki, even if students were unable to come to the team meeting. Students could access the discussion notes, they could contribute their notes and all discussion, feedback and exchange of ideas about the assignment was to be recorded on the discussion page:

‘And this was really successful in that the lecturer could see that the discussion pages were used really extensively and collaboratively and really well to communicate.’

Students who used the discussion page in this way achieved very good results for their final assignment. On the other hand, if students did not use the discussion page very much or very well, there was a corresponding lack of quality in their assignment. Wikis were found to be successful depending on the number of students and the design of the courseware and delivery, and it was deemed important that staff facilitate peer engagement (Waycott & Gray, 2011). The wiki history page was very useful and both students and lecturers could check the contributions. This helped eliminate the problem with group work where students did not contribute equally.

The Association for Learning Technology (ALT-C 2009 project) also suggested that visibility and transparency using online tools had a positive impact on academic integrity (Waycott & Gray, 2011). All student contributions were recorded on the history page, which included: 1) the start time for each contribution; 2) what they contributed; 3) how long they worked; and 4) who edited it. Mary (associate lecturer in academic development, 5) said that the lecturer found use of the wiki very helpful in supporting an assignment which was reflective of an authentic experience in the construction industry:

'She (the lecturer) was able to reflect the fact that there may be a large team of diverse people working together, collaborating and communicating which they could do in this particular space.'

Students assessed each other and the lecturer assessed their work by marking the assignments as well as the individual contributions. Careful monitoring of the course delivery and assessment requirements was necessary to ensure that the facilitator reading quantum was sustainable ((Waycott & Gray, 2011). Student surveys showed that they enjoyed the group work as the communication mode made conversations with peers easy to manage. When asked about the design challenges for collaboration, Mary (associate lecturer in academic development, 5) reflected that for the students it's another thing they have to learn: as well as doing the assignment and dealing with group work, the students had to learn a new technology as well. Mary (associate lecturer in academic development, 5) observed that from her viewpoint, the main obstacle for implementing social media was the rapidly evolving and changing nature of social media. Having to keep up-to-date with rapidly evolving social media and innovative usage that was effective in online and blended learning spaces was often an obstacle for academics due to the extra time commitment needed (Strong et al., 2012).

5.3.2 Diversity and social networking

A main challenge within instructional design is to design and deliver eLearning in a dynamic way that supports students with diverse backgrounds, aptitudes and preferred approaches to learning (Hadley, 2012). Controversy in the field of preferred learning styles should be catered for by the design of a variety of delivery modes for knowledge content, several information access methods and several types of learning activity (Palmer & Holt, 2012). There is agreement that the diverse cohorts (for example culture, background, language differences, prior knowledge and technical expertise) found within eLearning courses present learning design challenges.

Collaborative environments and student-centred discussions applying social constructivist principles of supporting learners to gain experiences as opposed to knowledge transferred proved to be successful in a case study conducted by C. Moore and Signor (2014, p. 367).

Aileen (academic manager for online programs, 1) observed that when there is such a diverse cohort in terms of age bracket and cultural background, there is often a language challenge and activities need to be focused with clear instructions:

'In implementing social media, to be inclusive – so the type of language you use is important ... you know you have a strong percentage of the cohort of students who want to work on their own – they are quite pragmatic too about their work – they want to get through it.'

Diversity extends then not only to catering for various learning styles, but also to taking into account age, cultural background and level of technical skills. As it is almost impossible to predict which characteristics and what preferences students have upon entry to a course, a seamless, user-centred design is suggested to cater to personalisation of the learning environment (C. Moore & Signor, 2014).

5.3.3 Fears

Another element that is not often considered when creating curriculum for blended and online delivery of collaborative delivery is fear of technology, peer interaction and learning performance anxiety. A very important part of the curriculum design process takes into account the fears of both students and lecturers. Students may not necessarily want to share information that may put them into an awkward position, expose them, or expose their mistakes (Waycott et al., 2013). Despite the fact that eLearning and social media have been used to deliver educational resources since the mid-1990s, there are still technophobia barriers to student engagement (Wang, 2014). Michael (instructional designer, 6) remarked that students remain apprehensive and still seem reluctant to put their own work online and share it publicly. Michael (instructional designer, 6) observed that students are used to creating assignments and completing exams in an online or blended environment. The technology enables restriction of access to examination and individual assignments to instructors and/or their unit coordinator. Michelle (associate lecturer in academic development, 5) supported the observation that medical students may not want to share information as it may expose their mistakes or enable others to use their work for academic performance gains:

‘And everybody makes mistakes but you don’t really want to publicise your mistakes. And you don’t really want to publicise what you don’t know.’

Not only students, but also academics are often afraid of the ‘unknown’ or uncontrolled conversations and open access to information enabled by social media. Deborah (instructional designer, 3) remarked that she was a bit afraid of getting sucked into the vortex of social media. When asked what she meant by that statement, she gave an

interesting reply, namely the obligation to use social media in her various professional and personal roles:

‘There is so many demands on my time, and as I’ve mentioned before – I need to set up a Facebook account which would be me as a writer, and then would I be using that as an instructional designer, me as a mother, and me as a person who works on the kinder committee – for all my roles, I wouldn’t have time to use social media for all of that. So I have to decide what am I going to use it for.’

Roger (educational designer, 7) describes his role as ‘trying to disseminate learning and teaching opportunities, and possibilities using affordances available predominantly within Moodle’. Roger (educational designer, 7) was of the opinion that many lecturers fear the ‘loss of control’ that they sometimes experience in the online environment. When discussion forums are not appropriately facilitated they can get out of control:

‘And I think they’re used to in the physical environment being able to shut down a particular speaker – saying I’m going to have to ask you to stop speaking – in the online environment I think they feel that people can just go and go – and all of a sudden things are happening online that was never the intention.’

Michael (instructional designer, 6) added an interesting observation on the generational aspect of eLearning, namely that it is not just the older, but sometimes the younger generation that are resistant to implementing new technologies:

‘And we so much just keep unfolding and unfolding this new stuff, on and on it goes... but maybe I’m just getting too old. But there are also lots of young academics who won’t take on the new tools. Too hard, too complicated, no, we’ve never done it that way before, no I didn’t do it when I was a student, no I’m not going to have that.’

Apparently some lecturers still want to teach the way that they have always taught and are luddites or slow adopters with respect to new technologies (McKay, 2008). Following on from the fears that people have when entering into the eLearning environment, the relationship between the student and the lecturer becomes an important dimension to either relieve or exacerbate those fears and perceptions (Majeski et al., 2015).

5.3.4 Student-lecturer relationship

Sarah (senior lecturer for academic development, 9) described a case study of a discussion forum activity in a postgraduate course consisting of five modules, where she got the students to facilitate a module. Students were required to familiarise themselves with the theme, and after completing the readings, had to facilitate an online discussion for two weeks. At the end of the two weeks they had to summarise the discussion as their assessment. Sarah (senior lecturer for academic development, 9) monitored the discussion, and sometimes facilitated the discussion through additional commentary. However, students mainly facilitated the learning conversation. Allowing students to facilitate discussions worked well provided that the process was monitored.

Sarah (senior lecturer for academic development, 9) also noted that students contributed their own resources and were providing content to other students:

‘Whereas I think if it was just left as a normal discussion, people would just come in and out as they please, and I think that added dimension of the responsibility for facilitating it actually meant that I had a lot of different communications going on.’

This example illustrates the complexity of the student-lecturer relationship within eLearning. Although students do want the presence of the tutor or lecturer, they also do not necessarily seem to want the lecturer to dominate and drive every conversation (Hrastinski & Aghaee, 2012; Palmer & Holt, 2012). During her interview, Aileen (academic manager for online programs, 1) described the tutor’s presence as leaving ‘digital footprints’, meaning that the tutor or lecturer needs to show that she was reading the discussion forum by making written comments and remarks:

‘So we always advise tutors even if there is no questions, to stop in there as part of that human-dimension, that there is someone there – just to say you’ve checked in and everything is OK.’

Michael (instructional designer, 6) also emphasised that whatever the mode of delivery, it remains important to personalise and ‘humanise’ the eLearning environment. He observed that one of the key things with online learning is the separation of the student from their academic:

‘We do have courses which are fully online – no tutorials, no lectures – everything is done online, and we go to some effort to try and personalise the materials that the students are presented. So that they don’t lose track of the fact that there is a human being somewhere in the picture.’

Michael (instructional designer, 6) stated that the fact that there seems to be ‘a human being somewhere in the picture’ does help students to feel more connected and supported to the learning environment. Not all people find the use of computers intuitive and computer phobia may also inhibit the use of technology (Willis, 2009a).

By means of summary, certain social media applications seem to support specific learning tasks more effectively, such as wikis for online collaboration and peer-assessment. A user-centred design that allows for individuation may cater for student diversity. The relationship between the perceived elements of human-dimensions within eLearning can be illustrated in Figure 5.2.

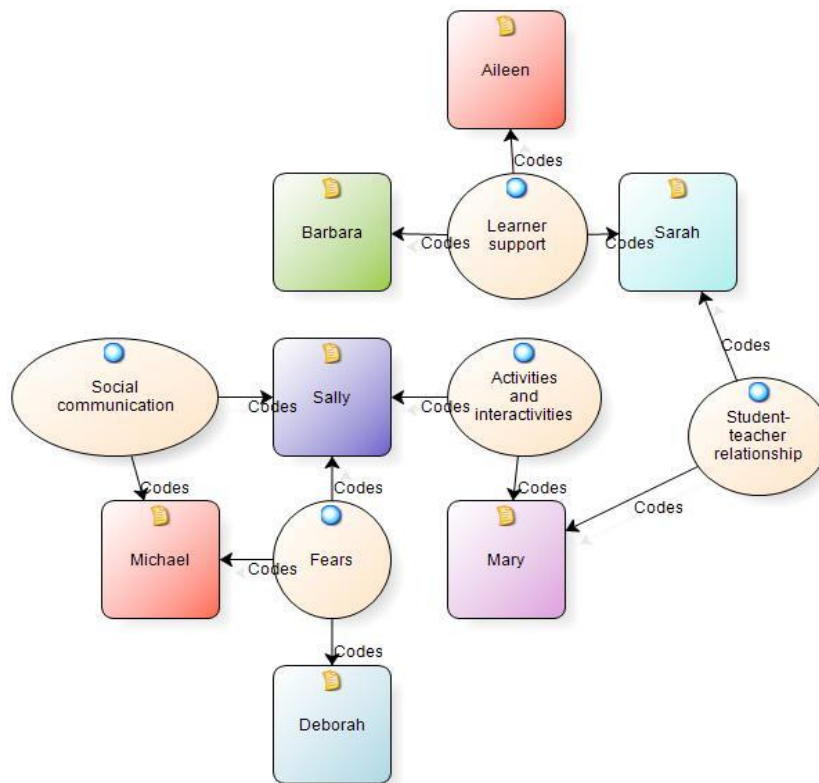


Figure 5.2: Relationship between perceived elements of human-dimensions

5.4 Guidelines for online social interaction

The next important themes from the coded data as guidelines for online social interaction that emerged as identified and perceived by the interviewees were: (i) authentic, meaningful and relevant interactions; (ii) user-centred design of the HCI; (iii) conscious modelling of behaviour through facilitation of learning activities and social interactions; (iv) rules for technology supported social engagement; and (v) spontaneous design of learning activities and interactions. Individuation is the process of allowing for personalised learning spaces and learner control, while remaining mindful that some students actually just want to study on their own (Wang, 2014). The concept, scope and boundaries of eLearning were important when designing for social interaction (G. White, 2013). This would need to take

place on organisational, academic (lecturer) and student level to address perceptions and expectations of both student and academic. The categories for this theme and the number of source codes are shown in Figure 5.3, as next discussed.

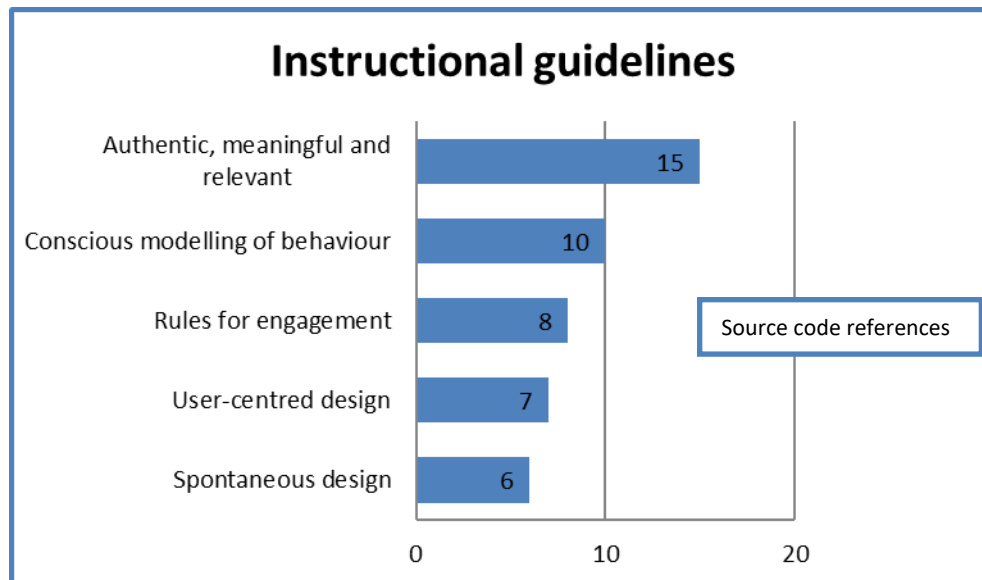


Figure 5.3: Instructional guidelines for learning design elements

5.4.1 Authentic, meaningful and relevant

The constructivist philosophy assumes that the creation of knowledge, information exchange, and knowledge transfer take place within a context of interaction between human beings (Jonassen, 1999). There is a hidden danger that activities may feel contrived and that students may feel under so much pressure to participate that it becomes uncomfortable rather than enjoyable, thereby hindering the learning process. All interviewees felt strongly that learning activities and assessments needed to be designed as authentic, meaningful and relevant to the learning that was taking place. Those three words emerged within all the conversations, and are seen as highly important when designing within an online environment. Authentic in this context implies that the learning activities and assessments reflect actual and/or real-life encounters that the students may have

outside the learning context (Herrington et al., 2010). This means learning activities are presented as situational, and need to closely resemble predicted real-life professional experiences (Clark & Mayer, 2008). For example, a journalism student would be required to debate a current event, or science students may need to gather and analyse data from their environment.

Application of knowledge to an authentic real-life problem and the creation of a proposed solution require high level meta-cognitive skills and prepare students for their work environment. As a further benefit, it may increase learner engagement because students can see the relevance of their learning to personal situations or life circumstances (Hadley, 2012; Oreilly et al., 2010).

Mary (associate lecturer in academic development, 5) observed that the eLearning environment feels more real and authentic if activities are genuine learning experiences:

‘I personally dislike being in a contrived learning situation where I feel that I’m being manipulated.’

Authentic activities also need to be meaningful and contextualised for the student (J. Bradley, 2010). Barbara (instructional designer, 2) stated that the learning activity design had to ensure contextualisation for situations that the learner may encounter. When designing instruction for the learner, contextualisation to make case studies relevant is required:

‘So maybe they are sitting in China, and they are coming from a rural area, and being moved into the city to learn new skills, and they will sell a Chinese car – so they have to be able to relate what I’ve designed to their context. To take it back to their local learning.’

Barbara (instructional designer, 2) observed that sometimes there would be three, four or five scenarios relating to a particular learning activity resource. For each student cohort

delivery, facilitators needed to ensure the relevance. Barbara (instructional designer, 2) was of the opinion that the ground rules for instructional design included a need to understand the learner, the learning environment, and the situation or professional graduate role context. Aileen (academic manager for online programs, 1) was also in agreement with the observation, stating that the most important instructional guideline was to:

‘Build in a relevance of why you are doing things, why the activities are there, and how that is connected to the previous activity.’

In conclusion, connecting activities does not just require a discussion thread or a synchronous or asynchronous activity. Learning activity connection requires authentic activities that create a valid and real learning experience (Lauwers, 2010) that is authentic and relevant to the learning context.

5.4.2 Conscious modelling of behaviour

Conscious modelling of behaviour is more than just showing examples of expected learning outcomes. Within the eLearning environment, conscious modelling also means that the lecturer or tutor models the ways to behave within an online environment. Lecturers are required to be early adopters of emerging technologies and understand the social norms for communicating online. Roger (educational designer, 7) stated that as a primary school teacher, the most valuable thing he did was implement a literacy framework for his class.

Roger described the conscious modelling of behaviour as providing opportunities for students to practice and try out new behaviours:

‘The best thing that I can think of, is when you are trying a new activity or tool, you do need to model a few examples first. So for the first couple of weeks I would recommend you get students to practice it or try things out – and you show them how it works. Consciously modelling what good learning and teaching should be.’

Therefore, within the eLearning environment, conscious modelling also means that the lecturer or tutor models the ways to behave within an online environment, how to interact, how to facilitate online discussion, and how to be part of a constructive online community (J. Bradley, 2010).

5.4.3 Rules for online engagement

Setting the rules for engagement upfront is a very important design principle. This theme is strongly linked with conscious modelling of behaviour. Roger (educational designer, 7) observed that ‘setting the rules for engagement’ and expectations for behaviour is a learning activity design challenge for many academics:

‘And I think a lot of lecturers find that very challenging too – I think they feel that they don’t have much control over the online environment. That a discussion forum can very quickly get out of their control.’

Within the learning program that Sarah (senior lecturer for academic development, 9) offers, there is a minimum number of required postings that students need to make within the discussion forum. The maximum length for each post is also specified as some students can ‘go on and on’ and this places a large cognitive load on other students and the facilitator (Williams et al., 2011). Sarah (senior lecturer for academic development, 9) said that

defining expectations and setting rules for engagement were really important because there was such a choice of tools and modes of communication freely available.

Unless you can actually say to students *'this is why you are doing it'*, they are not necessarily going to engage:

'And then you go on to say how you can actually use it, and what the expectations are. For instance, going back to that very basic one about discussion forums, which would be similar to whether you are using any other sort of social media, is a bit of an expectation of what contributions you expect students to make.'

Privacy and confidentiality are further issues within the theme of 'setting the rules for engagement'. Sarah (senior lecturer for academic development, 9) stated that one of the things that has stopped her from using some of the other, more freely available social networking tools was concerns about privacy and confidentiality, and the content being dealt with. Students and staff were often concerned about the public nature of conversations due to e-reputation and academic integrity concerns. The potential for inflammatory content dictates tight explanations of behavioural rules of engagement and careful facilitation of conversations online. Staff were often more comfortable using the technology that is available on-campus because of added security. Another consideration when explaining to students how to engage with technologies is positive role modelling of acceptable behaviour online and secure sharing of work.

Academic integrity and modelling of appropriate behaviours should be built into the curriculum. Setting the rules for engagement upfront is a very important design principle, and this theme was strongly linked with conscious modelling of behaviour.

The learning environment may alternate between fully online mode or partially online, including workplace training, laboratory work, face-to-face tutorials or lectures. When considering the learning design, the environment or mode of delivery need to be included.

An important consideration for instructional design is then to decide how much interaction to prescribe. Prescriptive learning activities becomes a design challenge when students are awarded marks for discussion forum interactions (Waycott & Gray, 2011).

5.4.4 User-centred design within the online environment

In order to create a seamless, user-centred design within eLearning, the needs and requirements of all stakeholders need to be understood and included within the learning design, preferably with the users as active contributors. The main conclusion from this exploratory study was that participatory design appears suitable for online education (Könings et al., 2010). Michael (instructional designer, 6) agreed with the concept of user-centred and participatory design, saying that students needed to remain the focus of learning design:

‘You can never forget your students. Students have to be the focus of everything we do. And they want feedback – so that communication link is there. We also like them to reflect on their learning so that they can say – this is going well, this isn’t going well, what did I really get out of that?’

The teacher, lecturer or tutor is also an important user of the eLearning environment. Barbara (instructional designer, 2) made the following important observation, namely to acknowledge the lecturer as part of the social network:

‘The second one as an instructional designer is to understand the teacher, to know the teacher, as the teacher is also part of the human dimension. Why design something that is of no use to a teacher? Why design something that a teacher find to clumsy to use, or is not relevant to how they can use it?’

Not only the users, but also the environments in which the resource will be used need to be considered.

Barbara (instructional designer, 2) noted in this regard:

'So if you can understand what environment this resource [will] be used in, and most of the time your guideline is – it can be used in any. It can be used solely online, without any teacher instruction, or it can be used in a virtual classroom, or in a face-to-face classroom and then their homework is to complete the rest online.'

Fred (senior lecturer in adult education, 4) remarked on another important aspect sometimes overlooked when planning the learning design, namely considering student access to infrastructure and resources. Fred (senior lecturer in adult education, 4) observed that students in remote communities may still only have dial-up or low speed internet connections available, and this ought to be considered when designing the student requirements for access to activities and assessments:

'If you're in a position where people are in industry and you know the workplace has a standard set of infrastructure available, but if you're talking part-time working from home you have no idea of what they have available.'

5.4.5 Spontaneous design

When allowing for user-centred, participatory design, an outcome may be that students could go on to spontaneously organise their own learning environments. The question raised was how much of the social media needs to be designed into the course, or how much should be left for the students to personalise and construct their own social interaction? One of the solutions raised by the interviewees was that lecturers and students need to be allowed to use the familiar technology. Traditional instructional design during the 1950s to the 1980s was geared towards designing paper-based learning packs or CD-delivery instruction. Therefore, the learning pathways for students had to be formally structured and learning activities and assessment tasks were mostly predefined, as these learning packages were time- and cost-intensive to change or update (Dick & Carey, 2006).

With the advent of eLearning environments, platforms were more robust and easier to adapt to the needs of learners, lecturers and environments (Clark & Mayer, 2008). Scaffolding, referring to the gradual progression of learning tasks, remained an important activity. This was especially important in subjects like mathematics where concepts and processes build onto each other (Reigeluth & Carr-Chellman, 2009). Social media and new ways of online social interaction open up more pathways for students to communicate with each other (Ashman et al., 2012). From the interview discussions as part of this research, examples were provided of lecturers who were finding that students used Facebook, Twitter and other social media to communicate outside of the formal learning environment. This is posing new challenges for instructional design, and means that the way in which learning activities and assessments are currently structured may need to be reconceptualised in terms of including emerging technologies such as wikis and blogs (Barton et al., 2009).

Mary (associate lecturer in academic development, 5) also raised the issue that students would rather use social media for personal communication and recreation:

‘Students may just want to use social media for socialising perhaps, personal communication and recreation – and maybe not necessarily for study – they may see it as impinging on their territory. And if lecturers are not doing it in a ‘cool’ way – maybe that’s not what the students really want them to do.’

Barbara (instructional designer, 2) noted that an important consideration for instructional design is to decide how much interaction to prescribe:

‘Which I guess you can – you say – what is the whole point of the social media? Surely it’s to communicate, surely it’s to share your ideas, so it doesn’t matter if they Tweet or if they Facebook or if they forum or sit in a classroom and physically discuss it together – but the whole point is we are sharing the information and building the idea together. So that’s when we know we’ve got it right.’

In summary, the learning activities need to be structured in such a way that they create an authentic, meaningful and relevant learning experience for the student. Students observe the way that lecturers behave in the online environment, and conscious modelling of behaviour includes more than just showing examples, but also modelling constructive ways of interaction such as collaboration and positive feedback within an online discussion. Expectations need to be managed in terms of privacy and confidentiality, especially when the subject matter is of a personal reflection or original thoughts or ideas. Academics could also be less prescriptive in the social media tools and allow students more freedom and spontaneous design in choosing the technology they wish to use, provided that the outcome of the learning task is achieved.

5.5 Design challenges for online social interaction

Design challenges as a theme emerged during the interview process. The main categories for design challenges were: (i) lack of feedback and evaluation; (ii) technology and learning outcomes; and (iii) organisational impact. These categories were coded as illustrated by Figure 5.4 and discussed next.

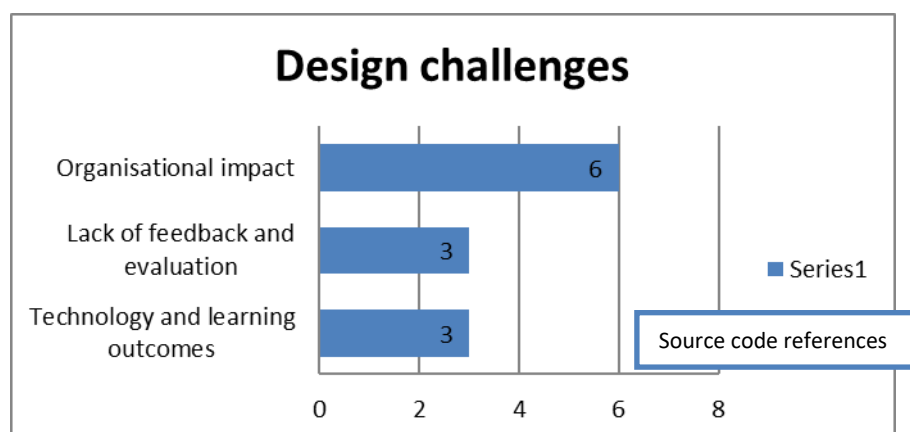


Figure 5.4: Design challenges for online social interaction

eLearning is broader than merely using technology to deliver a course. Higher-order thinking processes and deep learning occur when students are offered the opportunity to participate in social construction of knowledge (Biggs & Tang, 2011). Challenges for academics were that they often may not know what is possible using emerging technologies within the university infrastructure (Ellis et al., 2007). The lack of clarity of what eLearning actually means can sometimes also interfere with perceptions of eLearning. Perceptions of eLearning may influence what academics, course developers and students expect from the online experience.

5.5.1 Organisational impact on design for social interaction

Insufficient academic professional development and support for academics impacted adversely on organisational performance in terms of online deliverables. Sally (eLearning advisor, 8) commented on her perceptions of the current primary challenges for designing for interaction:

‘Staff would say the usual – that they are time poor and also inexperienced – they are quite insulated in what they see. I’ve mentioned before many staff aren’t aware of what is possible with new technology and social media.’

Sally (eLearning advisor, 8) also remarked on the fact that currently there was not a clear workload model for the design and delivery of online education. This was a further organisational factor that was providing a design challenge for both policy makers and lecturers to advance innovation:

‘No one has really worked out a nice accurate way of paying an online tutor, or working out what time should be spent either responding to emails and communications ... They see the online learning [as] ‘their normal job plus the online section added on’ a lot of the time.’

The expectations for eLearning design are often in stark contrast with organisational policies and restrictions. Sally (eLearning advisor, 8) raised the concern that if a staff member wanted to try a new activity or develop a new assessment item, there were often certain policy restrictions. The assessments that were created had to be approved by the Head of School, and possibly the teaching and learning unit. The technology-learning relationship may also be seen as a 'grey' or undefined area.

5.5.2 Technology and learning outcomes

Mary (associate lecturer in academic development, 5) noted that how technology could best support the learning outcomes in a unit/course/subject needed to be kept in focus during the design process. She stated that the learning outcomes within an online course are usually the same as face-to-face teaching. Mary (associate lecturer in academic development, 5) recommended using technology expertly whilst ensuring that students were experiencing minimal technological glitches, because that only served to remind them that they were in an online environment. An online experience may have taken away from the authenticity of the learning and disengaged students. Roger (educational designer, 7) remarked that as a project they were looking at specific multimedia presentations for a chemistry module, and lecturers wanted a range of plug-ins or special features from Moodle. This was problematic in terms of the technical licence and support.

5.5.3 Lack of feedback and evaluation

Design challenges included lack of feedback and evaluation, especially at a program level.

Barbara (instructional designer, 2) stated that she would like to get more feedback from teachers as to how successful the online collaborative delivery was:

'A lot of the time we're designing at the upfront, and you don't really get a lot of feedback on some projects as to: Was it worthwhile? Did it work? Is there a better way?'

Sally (eLearning advisor, 8) supported the viewpoint that feedback and regular evaluations were important to the ongoing design process. Programs and modules do not always have student feedback surveys on the learning experience, and even if the surveys exist, they do not always ask questions about the use of technology or the social interaction that took place during the course.

In conclusion, the design challenges for online social interaction are broader than reaching the learning outcomes for a specified eLearning course or program. Insufficient academic professional development and support for academics, and vague workload description, organisational policies and restrictions may adversely impact on the implementation of emerging technologies. Lack of or insufficient program evaluation also inhibits improvements to course design in terms of social interaction.

5.6 Implications of findings for social learning presence

5.6.1 Build trust

Results of the research study (Chapters 4 and 5) indicated that in order to develop a learning community, it is necessary to share a common purpose despite the increased disparate range of students attending online courses (Rennie & Morrison, 2013). A lack of a sense of trust (technological or interpersonal) may adversely affect group dynamics, and it is therefore imperative to build trust within the lecturer-student and student-student exchange to contribute to meaningful interactions (Wang, 2014). Consideration needs to be given that many students are studying part-time and have existing work and family commitments and other various social networks, and good design would incorporate this aspect of student life.

5.6.2 Create experiences

When taking into account diversity of the student population (e.g. culture, background, language differences, prior knowledge and technical expertise), the best approach is personalisation of the learning environment. Opportunities for students to reflect socially (e.g. in a space such as Twitter or discussion forum) or affectively (such as documenting their experiences in an online journal or blog) create experiences that contribute to social learning presence. When these experiences are part of formative and subsequent summative assessment activities, the potential for higher order thinking skills and deep learning processes is increased (Kolb, 2014). Findings from the qualitative data collection contributed to the understanding of the learning design element social learning presence, as illustrated by Figure 5.5.

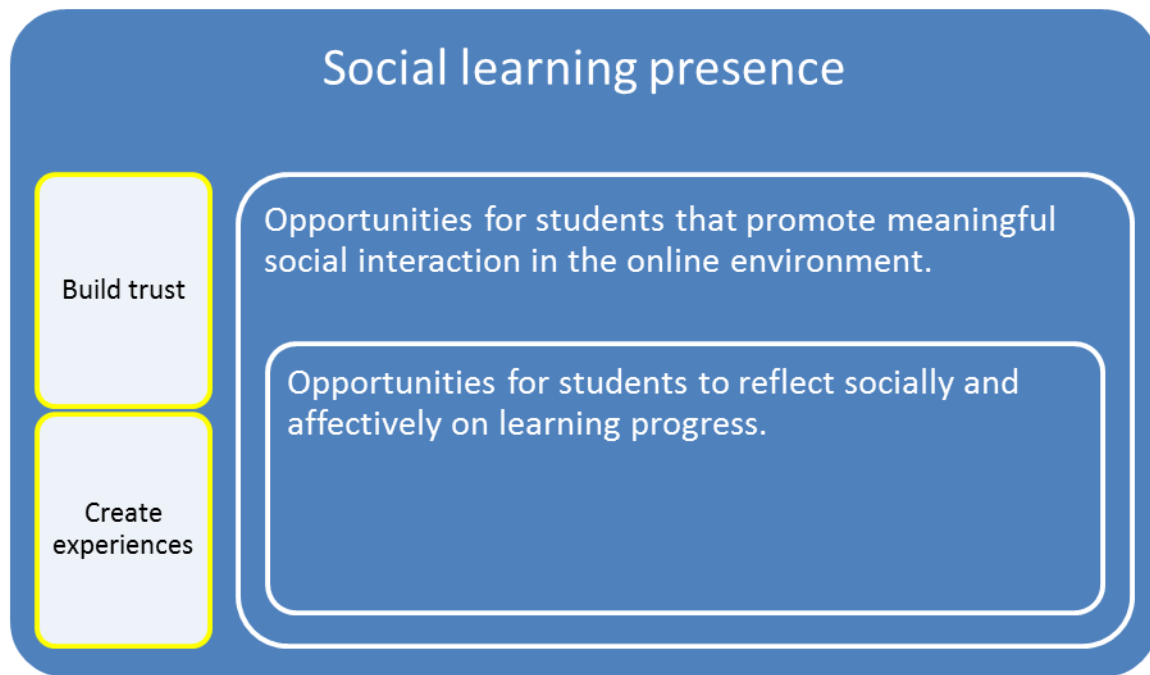


Figure 5.5: Implications for social learning presence

5.7 Implications of findings for social learning interaction

5.7.1 Establish collaborative networks

Although it was rated as useful by the eDelphi expert panel for students to solve problems together in a coordinated effort, based on the findings it is even more important that the learning also be internalised. Students need to be able to share or articulate their learning to others in the group in a comprehensive way to show that mere memorisation of the information (or rote learning) did not occur (Cope & Kalantzis, 2013). Collaborative networks may also contribute to students finding the online learning space a less isolated place and assist with the socialisation of remote students by providing a platform where they can meet and share (Majeski et al., 2015).

5.7.2 Share individual perspectives

One major critique against online group work and social networking is that it may be difficult to assess individual student performance based on collaborative tasks (Hrastinski & Aghaee, 2012). Results from the semi-structured interviews provided a possible solution to this difficulty. The structured use of wikis such as MediaWiki for online collaboration may help establish online collaboration as well as be an indicator of students' individual contributions (Osman-Schlegel et al., 2011). Revised review criteria 2.1 and 2.2 from the findings of the eDelphi expert panel and semi-structured interviews for social learning interaction are shown in Figure 5.6.

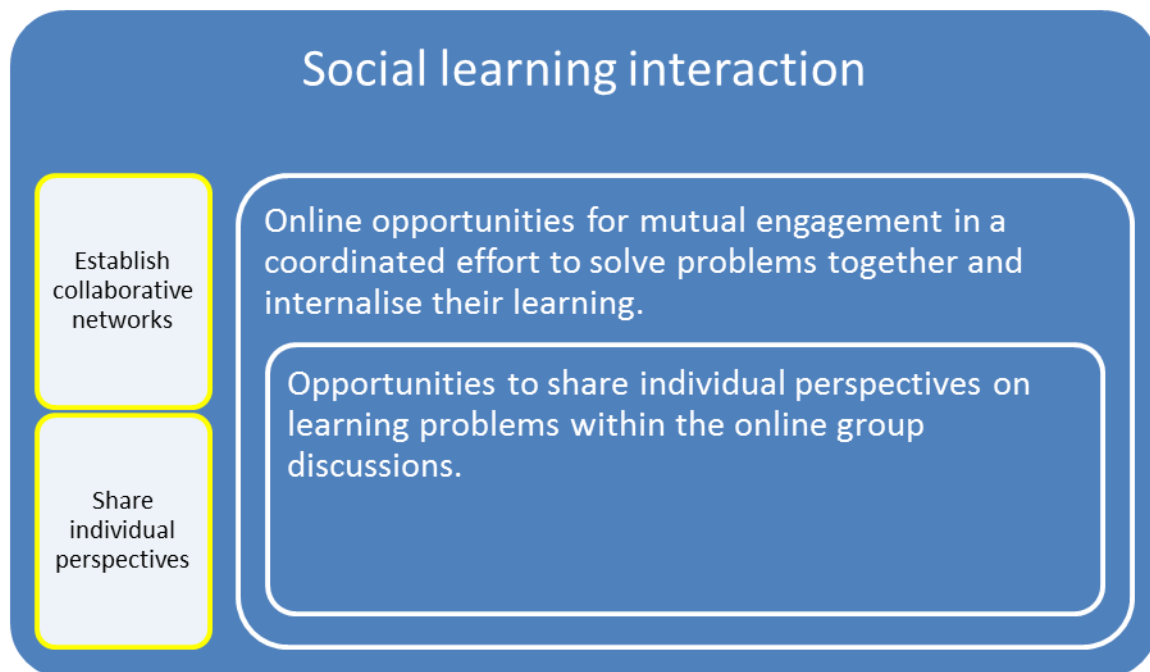


Figure 5.6: Implications for social learning interaction

5.8 Implications of findings for knowledge-sharing space

5.8.1 Establish virtual teamwork

Knowledge-sharing space refers to how the online learning design is maximised to allow for sharing and distribution of knowledge in a safe space. From the feedback of the eDelphi expert panel (Chapter 4), when establishing virtual teamwork spaces, the protection of intellectual property, the incentive to share and creating a safe space for sharing (not being 'ripped off' or exploited) become imperative, as is also reflected in the literature (Wang, 2014). Within online learning situations, assessment is usually the key motivator for students to complete learning activities. Further incentives would be if students know their own work would be acknowledged, and that their ideas won't be 'stolen' but rather contribute to their grade. The key tension is to design collaborative learning activities that could be assessed as contributing towards the group effort *and* acknowledged for individual contribution. The use of peer-assessments (evaluating peer efforts) and self-assessment (evaluating own efforts) may help to assist with this task, and further the establishment of virtual teams (Barnes, 2012).

5.8.2 Respect diversity

Findings from the eDelphi expert panel (Chapter 4) warned that a very diverse student cohort, especially when no efforts are made to find similarities and when there are huge differences in time zones, may adversely affect social cohesion. Differences may occur in culture, background, language, prior knowledge, technical expertise and the much-debated learning styles (Kolb, 2014). Further factors that are included when considering student diversity are fear of using the technology, social anxiety (how others may interpret my

contribution) and performance anxiety (how others would judge or evaluate my contribution).

This may cause students to be apprehensive about sharing their work in online discussions, blogs or other social media outlets (Rienties & Nolan, 2014). As many of these variables cannot be predicted upon the outset of a course or module, the needs and requirements of all stakeholders (i.e. learners, academics, tutors etc.) need to be understood and included within the learning design by making use of a user-centred or learner-centred approach (Könings et al., 2010). An inclusive design would also consider access to infrastructure and resources and consider students in impoverished or remote communities (Winters & Toyama, 2009), as presented by Figure 5.7.

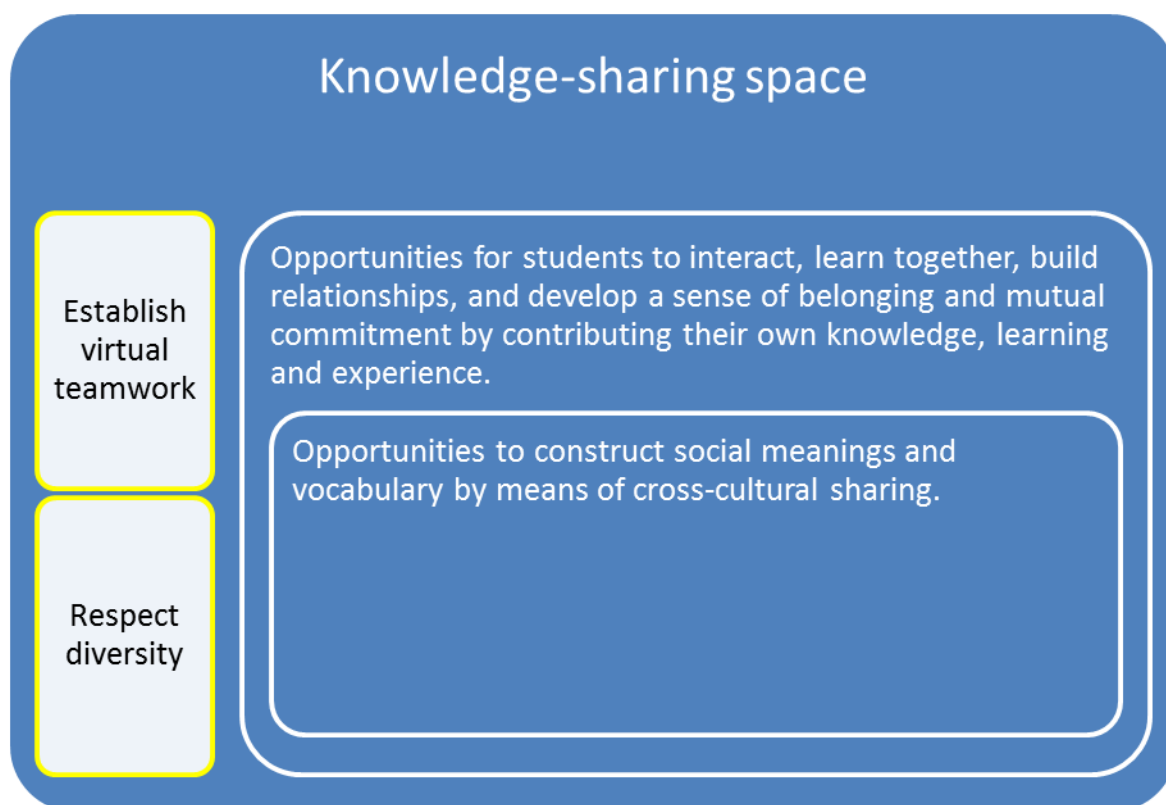


Figure 5.7: Implications for knowledge-sharing space

5.9. Implications of findings for meta-cognitive load

5.9.1 Structure sequence and progression

It is essential that the sequence and progression of an online course allows opportunities for students to think through difficult concepts, as derived from the findings from the eDelphi expert panel. Too often the learning activities may be too densely presented within a very short time-frame and students may be too rushed to internalise their learning. When learning online, learners should be given the opportunity to reflect on what they are learning, collaborate with other learners, and check their progress (Kirschner et al., 2006) in such a way that critical thinking skills are promoted.

5.9.2 Present authentic, meaningful and relevant instruction

All interviewees for the semi-structured interviews felt strongly that instruction needs to be presented in an authentic, meaningful and relevant way. Authentic activities help students to make the link between theory and practice (Herrington et al., 2010) and may increase student engagement when they see the relevance of the activity or assessment. When students are set tasks to anticipate the consequences of actions, set goals and weigh evidence from various sources of information, these learning tasks need to be situated within authentic scenarios (Lauwers, 2010), as summarised by Figure 5.8.

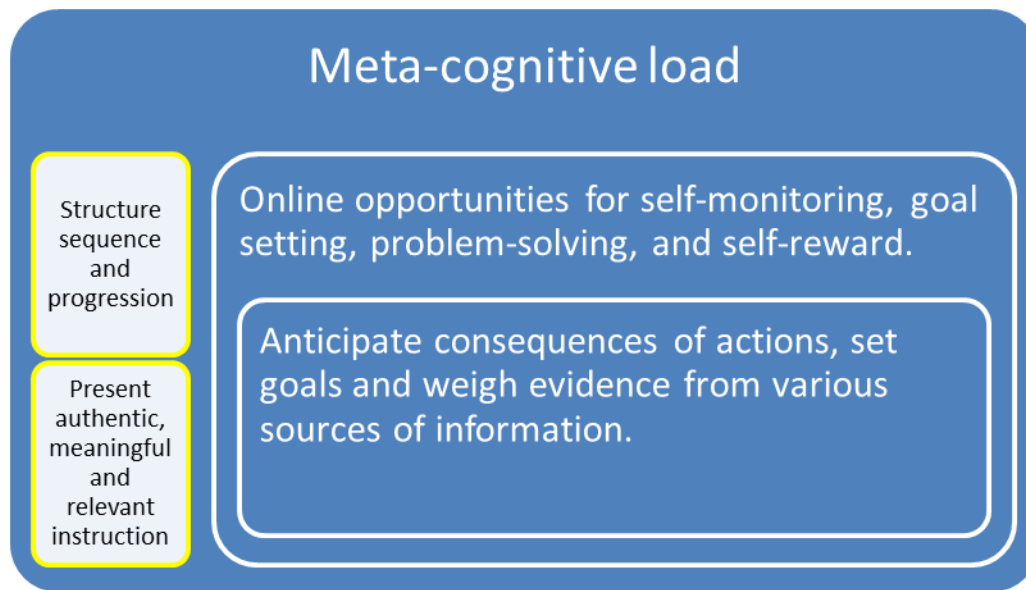


Figure 5.8: Implications for meta-cognitive load

5.10 Implications of findings for knowledge co-construction

5.10.1 Allow spontaneous design

Tension exists between how much of the social interaction needs to be prescribed in a formal way, and how much should be left for informal learning pathways. Based on findings from the semi-structured interviews, when designing for social interaction the following elements need to be considered: (i) authentic, meaningful and relevant interactions; (ii) user- or learner-centred inclusive design; (iii) conscious modelling of behaviour; (iv) rules for technology supported social engagement; and (v) spontaneous design, namely allowing students to select the technology they are comfortable with for their group, individual or peer-supported projects. There appeared to be consensus amongst the respondents that the aim of the learning activities and assessment tasks needs to be the sharing of information and co-construction of knowledge, rather than which social media or online tool the students are making use of towards that aim.

5.10.2 Enable application and transfer of existing knowledge

The student-lecturer relationship plays a role as an enabler of application and transfer of existing knowledge. Allowing students to facilitate their own discussions while the lecturer played a monitoring role proved to be successful. Academic presence is important, but the lecturer or tutor should not dominate the online interaction (Hrastinski & Aghaee, 2012).

Academic constraints that may further inhibit the co-construction of knowledge are: (i) lack of feedback and evaluation on program outcomes and student satisfaction rates; (ii) difficulty using the new technology; (iii) online tasks and assessments not clearly aligned with the learning outcomes; and (iv) organisational impact such as insufficient professional development and unclear policies around the implementation of new technologies.

The implications of the findings for knowledge construction are summarised by Figure 5.9.

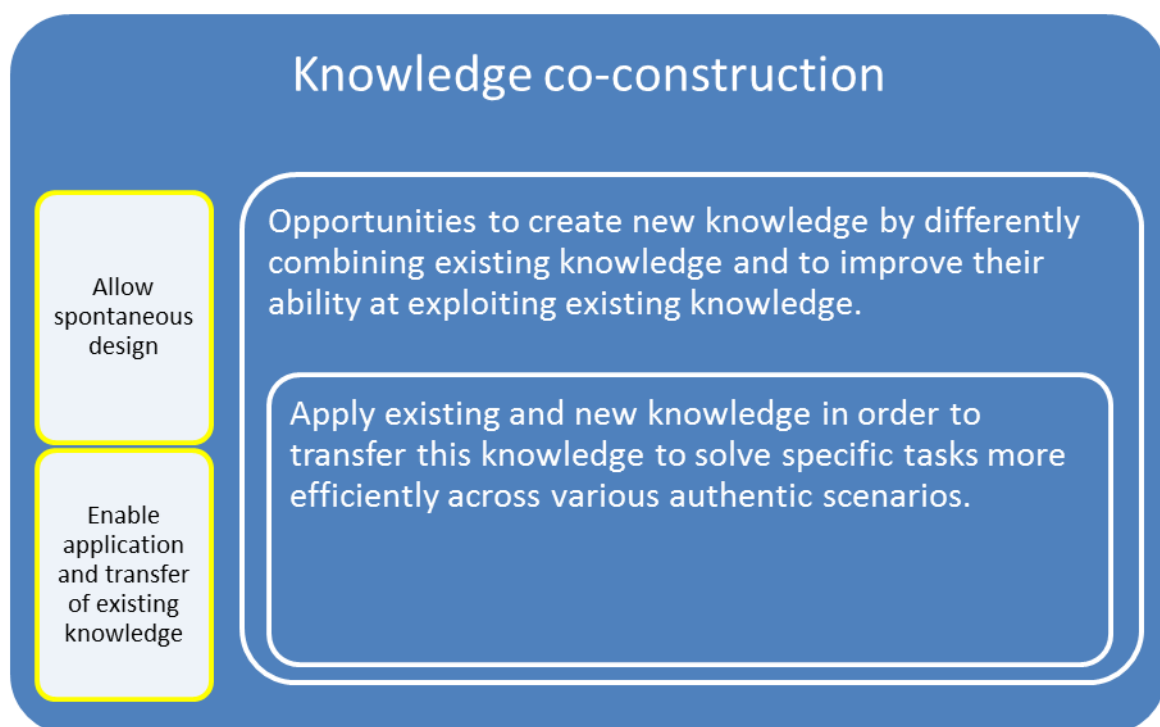


Figure 5.9: Implications for knowledge construction

Following is a visualisation of the summary of the qualitative findings as derived from the research data (Figure 5.10).

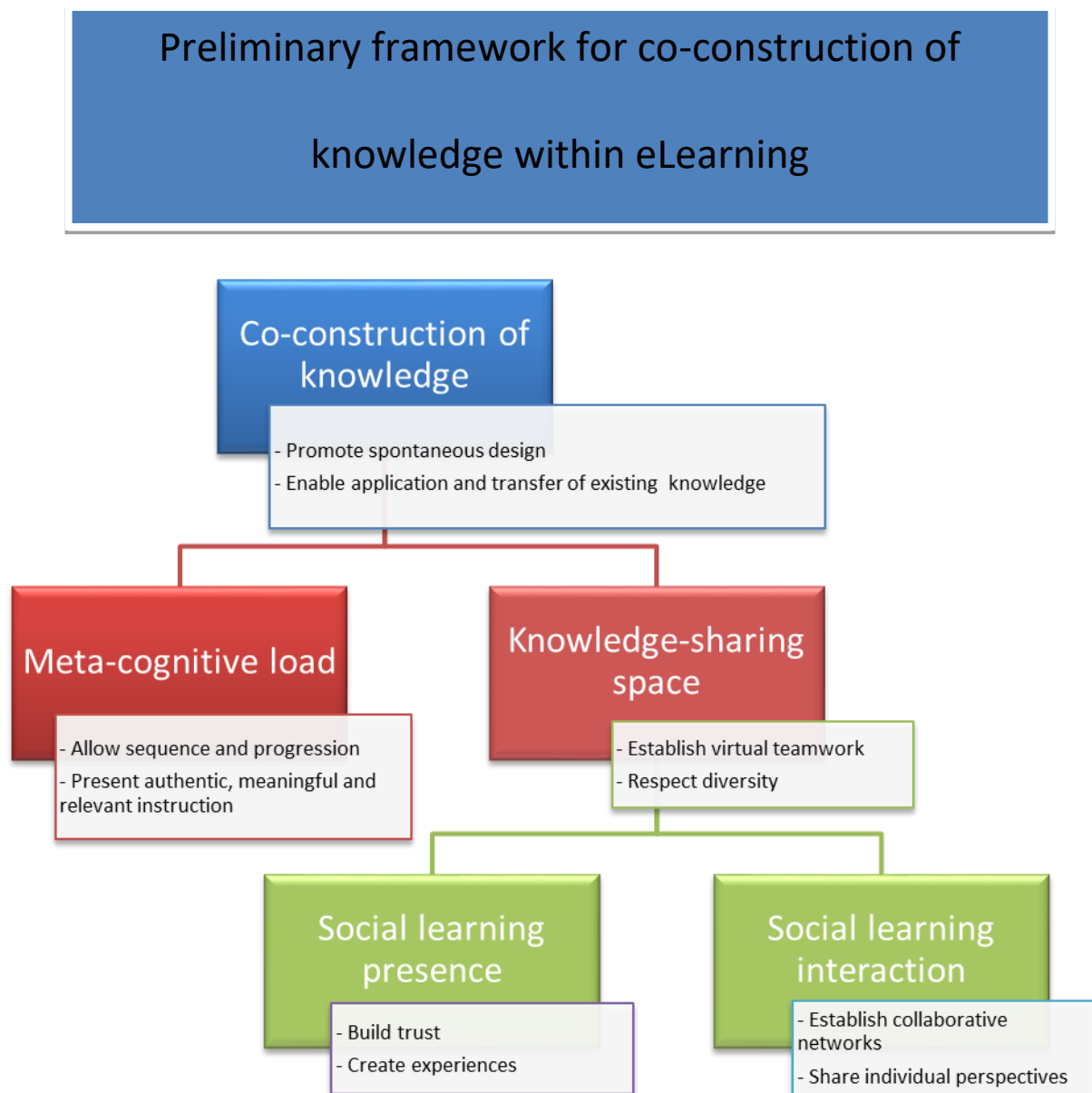


Figure 5.10: Preliminary findings for the eLearning framework

5.11 Summary

This study set out to investigate learning design elements for an eLearning framework that promote the use of emerging technologies for social networking and co-construction of knowledge. The purpose of the qualitative study was to determine consensus of definitions, rationale and review criteria for each of the learning design elements. The respondents' perceptions of the human-dimension, experiences with social media, perceptions of instructional guidelines and challenges for designing for social interaction influence how practitioners view the learning design elements. The categories that emerged from data coding of the perceived elements of the human-dimensions within eLearning were the learning activities and interactivities, social communication, collaboration, diversity, fears and the student-lecturer relationship. These categories need to be considered when designing for social learning interaction as they are geared at addressing the human interaction with technology.

The instructional guidelines considered most important when designing for online social interaction were authentic, meaningful and relevant instruction; conscious modelling of behaviour; rules for engagement; user-centred design; and spontaneous design. All interviewees felt strongly that learning activities and assessments needed to be designed as authentic, meaningful and relevant to the learning that was taking place. Design challenges for online social interaction included the organisational impact of including social media tools, alignment of technology and learning outcomes, and lack of feedback and evaluation of eLearning programs.

The expectations for eLearning design were often in stark contrast with organisational policies and restrictions. Programs and modules did not always have student feedback surveys on the learning experience, and did not always ask questions about the use of technology or the social interaction that took place during the course. This is a further organisational factor that is providing a design challenge for both policy makers and lecturers to advance innovation.

CHAPTER 6 VALIDATE AND REFINE LEARNING DESIGN ELEMENTS

6.1 Introduction

The third and final phase of the quantitative data collection process was an electronic survey. This chapter further explores the research question of how the effectiveness of the learning design elements to support social networking and co-construction of knowledge can be gauged, in terms of learning performance effectiveness, in order to create a framework for optimised eLearning within the Australian eLearning higher education context.

The survey instrument was designed to investigate how each of the learning design elements translates into academic practice, and what academics are currently employing within the realm of online higher education to provide practical examples for each of the learning design elements. This survey was distributed to academic practitioners in the field of eLearning and within the context of Australian higher education.

6.2 The electronic survey

The electronic survey was constructed in RMIT Qualtrics and resulted from the findings of the qualitative data analysis. This survey was distributed to academic practitioners in the field of eLearning and within the context of Australian higher education, following the same characteristics as the purposeful selection of sampling methods described earlier in Chapter 3. A pilot survey was launched from 28 July 2014 until 22 August 2014, as documented by Table 6.1.

Table 6.1: Distribution of the survey

Survey	Date distributed	Population	N
Pilot survey	28 July 2014 until 22 August 2014	30	14
Final survey	13 October 2014 until 31 October 2014	434	113

The surveys were distributed by emailing out electronic links to the survey. Participation in the survey was voluntary and respondents had to agree to the plain language statement. The pilot survey was distributed to 30 potential respondents and 14 surveys were returned.

6.2.1 Testing for validity and reliability of the survey instrument

Adaptations to the final survey (Appendix J) were based on the analysis and preliminary findings from the pilot survey. Qualitative research focus on the validity rather than reliability to determine whether the account provided by the participants is accurate, can be trusted and is credible (Lincoln & Guba, 1985). Checking for qualitative validity means assessing whether the information obtained through the data collection process is accurate (Cresswell & Plano-Clark, 2011).

For the purpose of this study, the researcher made use of member-checking in which case summaries of the findings were presented to the key participants and they were asked if it was an accurate reflection of their experiences (Cresswell & Plano-Clark, 2011, p. 211).

The second method of validity employed for this study was triangulation of the data drawn from several sources (transcripts of the semi-structured interviews, coding of the data tables, transcripts from the eDelphi discussion forum) to build a theme (Teddlie & Tashakkori, 2009).

6.2.2 Distribution of the survey

Further action was required to increase the number of responses for the survey. The researcher contacted the central learning and teaching units and asked for the survey to be endorsed prior to sending it out. The survey description was updated and ensured that respondents understood the nature and value of the survey in terms of their own academic work. The electronic survey was distributed by means of the RMIT Qualtrics survey software. The final survey was launched from 13 October until 31 October 2014. One reminder email was sent out to respondents on 20 October. The survey was extended again, and the final survey response was received on 11 November, after which the survey was closed.

The survey was sent out to 434 potential respondents, of which 143 respondents started the survey and 115 respondents completed all Likert scale questions in the survey. Among the 115 respondents, 2 did not answer any of the demographics questions. Thus, after excluding subjects with missing responses in the Likert scale questions or with no demographic information, a total of $n = 113$ respondents were included in the analysis of the survey data. The survey questions are presented in Appendix H.

6.3 Demographics of the electronic survey

Following is a summary of the respondents' employment positions (Figure 6.1).

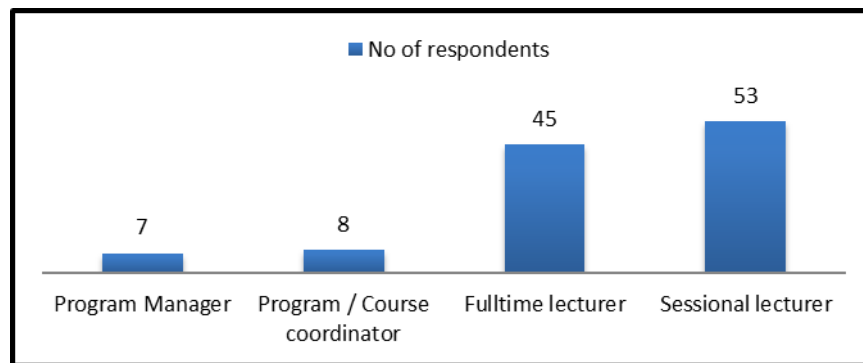


Figure 6.1: Employment position summary

A little over half of the respondents were female (56.3%). Around 60% of the respondents had less than 5 years of experience in online higher education, with a Master's/doctoral/professional degree, and were from the state of Victoria. Figure 6.2 presents the demographic distribution of the 113 respondents.

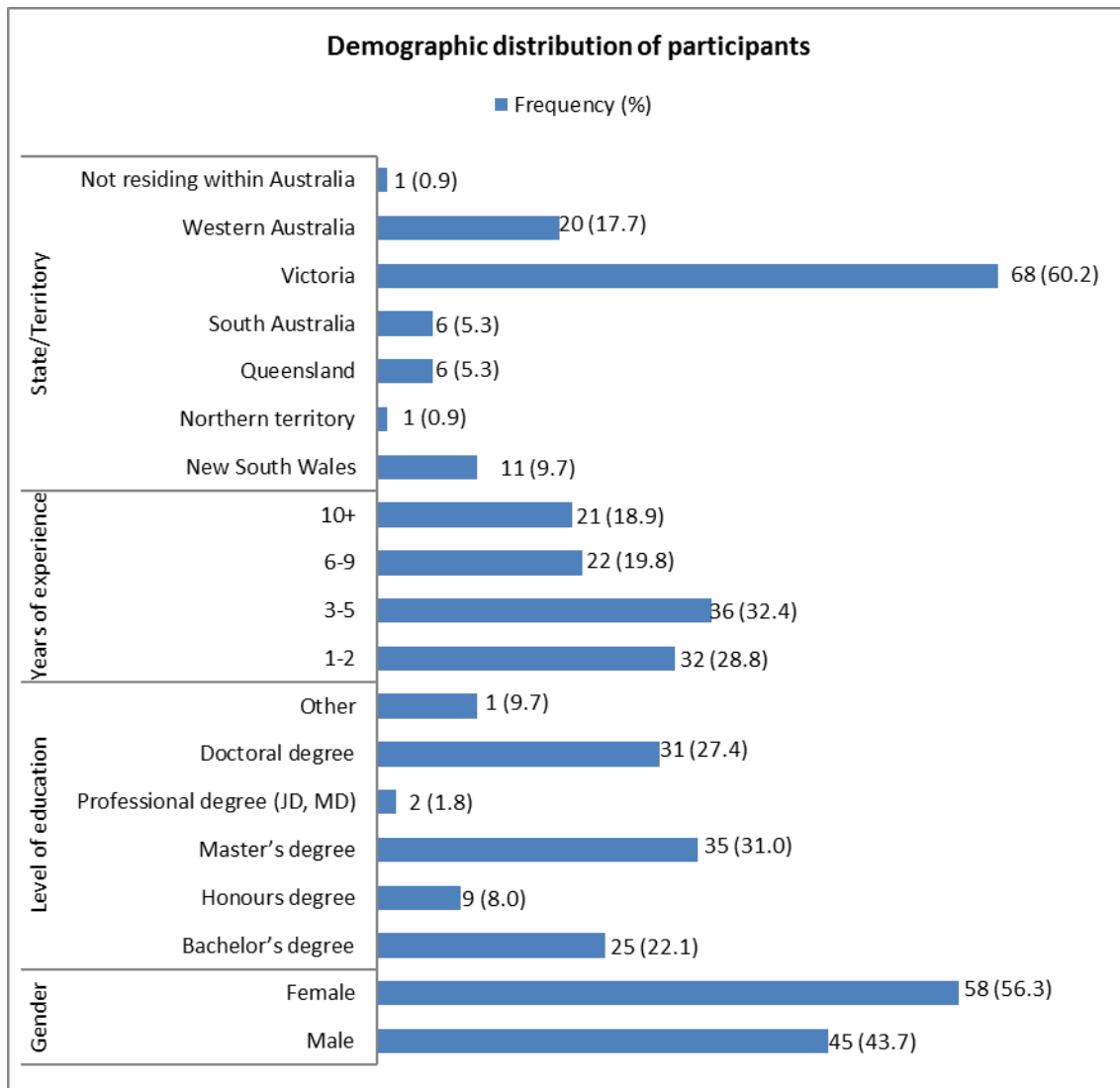


Figure 6.2: Demographics

Overall survey responses were summarised using frequency tables and summary statistics. Summary statistics for survey responses between female vs. male (Wilcoxon rank-sum test), among education levels, among years of experience, and between respondents from the state of Victoria and respondents not from the state of Victoria were also presented. Note that for education level, professional degree and doctoral degree were combined into one category; honours degree was combined with 'other' degree. The survey questions and how they relate to the description and criteria of each design element are set out in Appendix I.

6.4 Social learning presence in academic online practice

Question 1: Please rate the importance of the following tasks when you teach as a facilitator (e.g. tutor, lecturer, instructor) in the online classroom.

Respondents were asked to rate the following seven items regarding the importance of online facilitation tasks: 1) provide biographical data of yourself; 2) facilitate the discussion forum; 3) create a Facebook page for students; 4) allow students to determine their own rules for online interaction; 5) facilitate online learning tasks; 6) set up rules for online interaction; and 7) provide constructive feedback on assignments. Figure 6.3 shows the frequency of the responses for question 1.

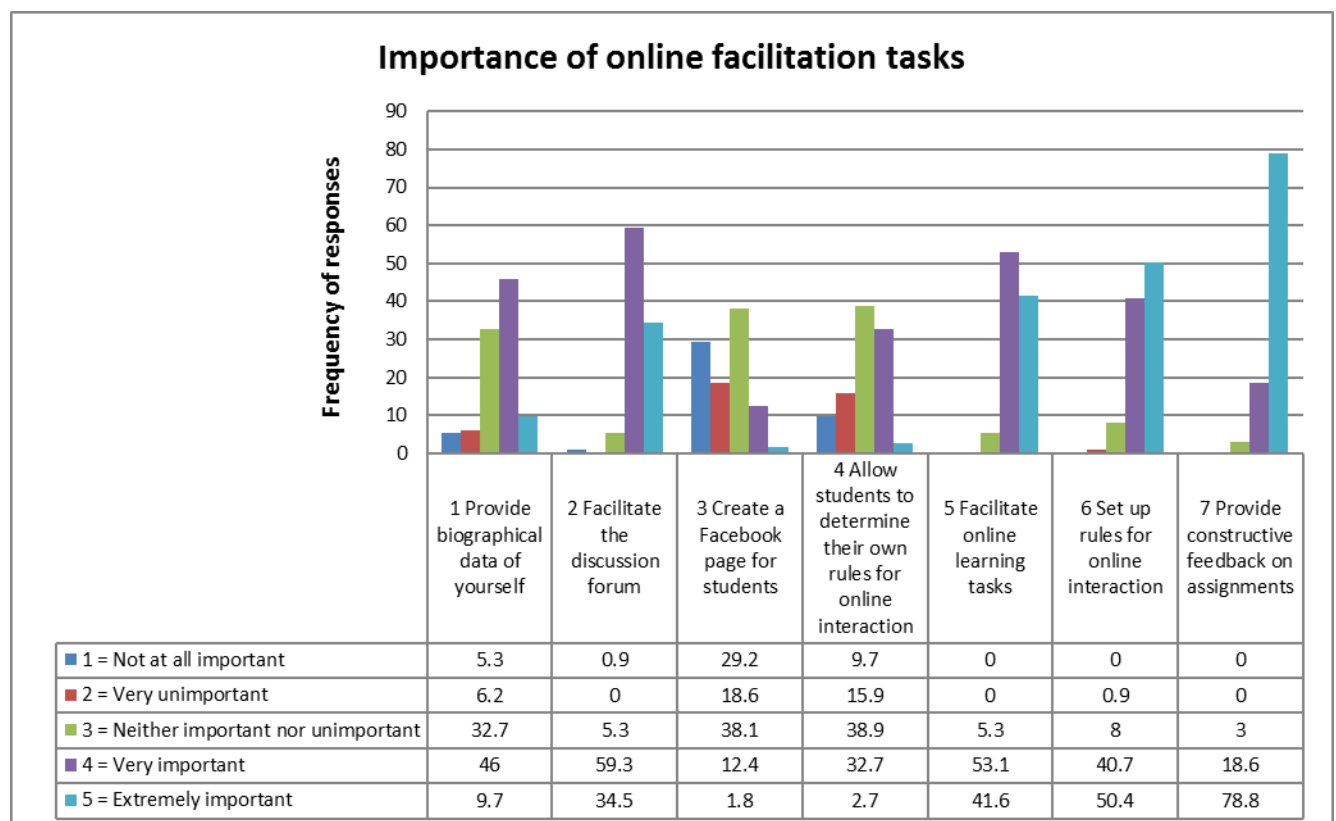


Figure 6.3: Importance of online facilitation tasks

Six items presented with a mean rating of above three, indicating that respondents recognised the importance for the lecturer or tutor to establish a strong social presence within the online environment such as providing biographical data and facilitating the discussion forum. Figure 6.4 shows the mean and standard deviation of the seven items regarding the importance of online facilitation tasks.

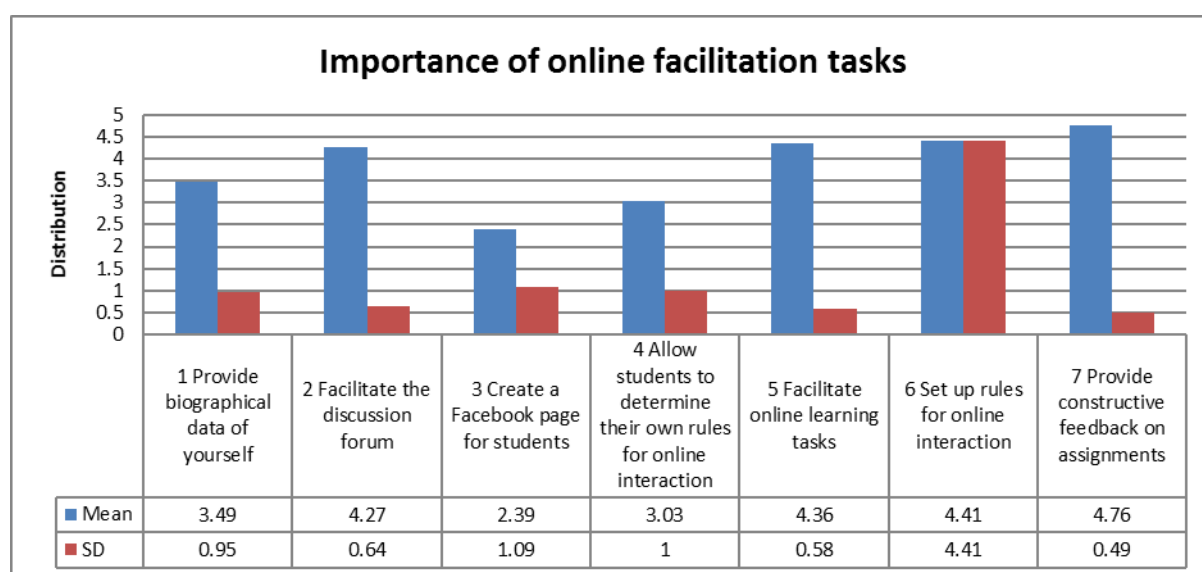


Figure 6.4: Mean and standard deviation of online facilitation tasks

Item 3 (create a Facebook page for students) was the only item with mean below 3, indicating that respondents did not think creating a Facebook page for students was an important task for a facilitator in an online classroom. However, the perception seems to be that it is important for the academic to remain available for students whatever medium is used. A senior lecturer (respondent 32) commented:

‘Being available, flexible with time and reachable, whether that through Facebook or other communication methods creates an environment where students feel less isolated.’

6.4.1 Comparing variables for importance of online learning tasks

For each relevant item, the Wilcoxon rank-sum test or Kruskal–Wallis test (Hollander & Wolfe, 1999) was performed to investigate if the perception of respondents was statistically significantly different between female and male respondents (Wilcoxon rank-sum test), among education levels (Kruskal–Wallis test), among years of experience (Kruskal–Wallis test), and between respondents from the state of Victoria and respondents not from the state of Victoria (Wilcoxon rank-sum test). For education levels and years of experience, if the results of Kruskal–Wallis test were significant, Dunn’s procedure (Dunn, 1964) for pairwise comparisons was performed to investigate which two groups of respondents were significantly different in the perceptions. A p-value less than 0.05 indicated significance. All data analyses were performed using SPSS version 22 (IBMC Corp, 2013).

It appears that respondents with different levels of education had different perceptions regarding facilitating online learning tasks ($p = 0.030$). In particular, the results of pairwise comparisons using Dunn’s procedure suggested that facilitating online learning tasks was regarded as more important for respondents with a Master’s degree ($M = 4.57$, $SD = 0.61$) than for respondents with other degrees ($M = 4.15$, $SD = 0.59$) ($p = 0.035$) (Appendix J, Table 6.2).

Although the Kruskal–Wallis test suggested that there was a difference in the perception of facilitating the discussion forum among people with different years of experience ($p = 0.035$) the results of pairwise comparison using Dunn’s procedure suggested that none of the pairwise comparisons was significant. Therefore, it may be concluded that education levels rather than years of experience result in a significant difference in terms of perceptions regarding the importance of online facilitation tasks.

Respondents were also asked to state if there were any other activities that they considered to be of high importance when teaching as a facilitator in an online classroom (open-ended question, item 2). Factors which were rated within the open-ended question section as important were speedy responses to student enquiries, weekly assessment mechanisms, personal touch and overall creating and maintaining a sense of availability.

It is important for social learning interaction to include students in the moderation as well as setting up rules for behaviour, as a program manager (respondent 5) commented:

'We should also encourage learners to moderate discussion forum of one of the topics.'

6.4.2 Online tasks frequently employed

Question 3: Which of the following learning tasks do you employ on a regular basis in your online classroom?

Respondents were asked to rate how frequent the following learning tasks were employed on a regular basis in the online classroom: 1) small group online tutorials; 2) group work project; 3) individual written assignment; 4) virtual laboratory activity; 5) field work experiment; 6) online quiz; 7) online final examination; 8) blogging activity; 9) wiki activity; 10) webinars such as Blackboard Collaborate; and 11) online portfolio activity. The frequency of responses is shown in Figure 6.5.

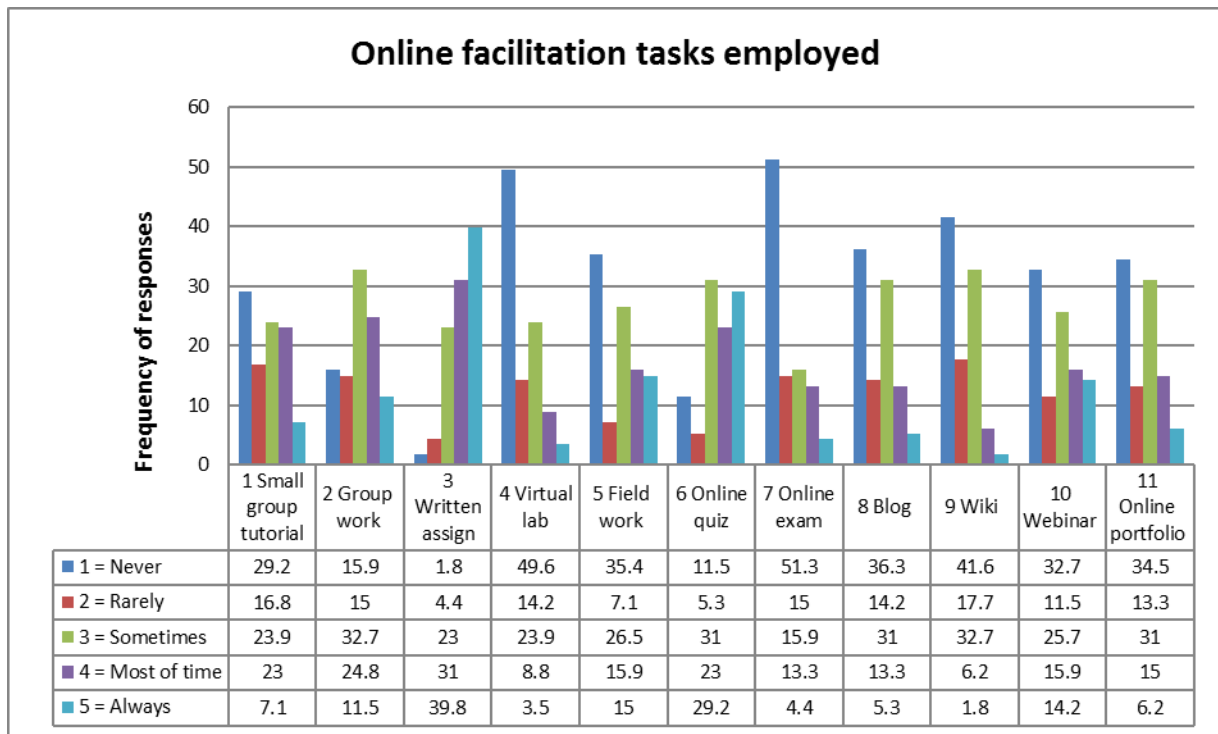


Figure 6.5: Learning tasks employed on a regular basis

The mean responses ranged from 2.03 to 4.03, and the individual written assignment ($M = 4.03$), online quiz ($M = 3.53$), and group work project ($M = 3.01$) were the three most frequently employed learning tasks on a regular basis in the online classroom. Although the individual written assignment received the highest nomination, it is encouraging to observe that more interactive and problem-based techniques such as online quizzes and group work projects are frequently employed. Virtual laboratory activity ($M = 2.03$), online final examination ($M = 2.04$), and wiki activity ($M = 2.09$) were the three least frequently employed learning tasks on a regular basis in the online classroom, as illustrated by Figure 6.6. This is to be expected as the inclusion of virtual environments and social media in online learning courses has only gained prominence over the last few years (Singh & Hardaker, 2014).

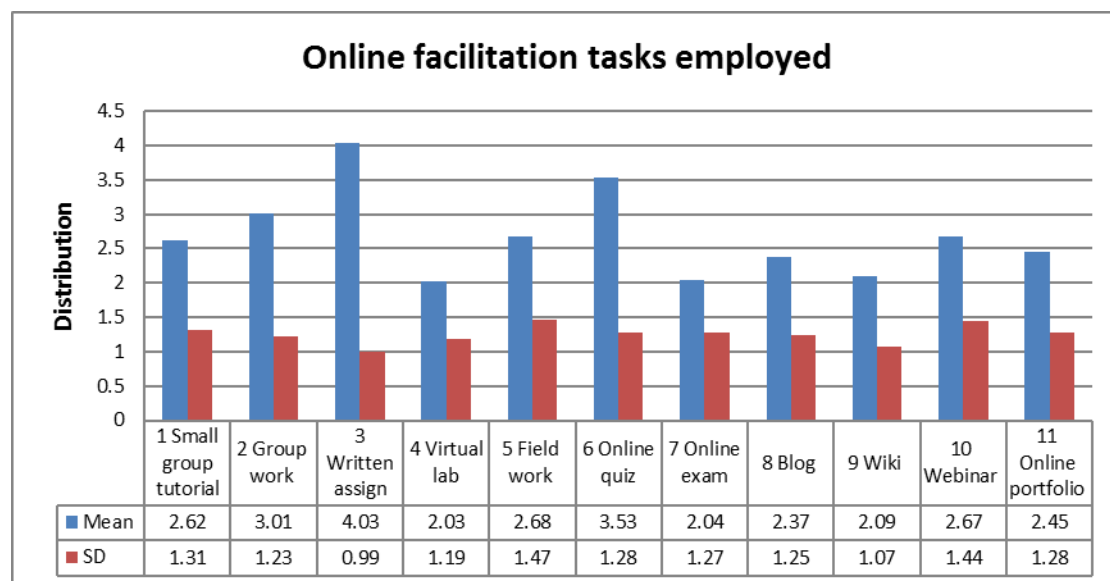


Figure 6.6: Mean and standard deviation of online tasks regularly employed

These findings also indicate that academics are willing to try out new technologies, even if the uptake is not very wide-spread yet. A fulltime lecturer (respondent 41) replied that it is more important to experiment with technologies that are useful and user-friendly as opposed to those that are clunky or less user-friendly on an ongoing basis:

'I also experiment with new technologies so that students can experience the latest technologies available then 'choose' whether to continue to use it when they have completed my course.'

6.4.3 Comparing variables for online tasks frequently employed

Analysis of the descriptive statistics for the online facilitation tasks employed by levels of education, years of experience, and location indicated that there were differences in how often two online facilitation tasks – group work project and individual written assignment – were employed among respondents with different levels of education ($p = 0.017$ for group work project; $p = 0.005$ for individual written assignment) (Appendix J, Table 6.3).

In particular, the results of pairwise comparisons using Dunn's procedure suggested that group work project was employed more often for respondents with a professional/doctoral degree ($M = 3.52$, $SD = 1.25$) than respondents with a Bachelor's degree ($M = 2.60$, $SD = 1.19$) ($p = 0.034$). Also, individual written assignment was employed more often for respondents with a professional/doctoral degree ($M = 4.48$, $SD = 0.87$) than respondents with a Bachelor's degree ($M = 3.80$, $SD = 0.91$) ($p = 0.016$), with a Master's degree ($M = 3.91$, $SD = 0.98$) ($p = 0.045$), and with other degrees ($M = 3.91$, $SD = 0.98$) ($p = 0.027$) (Appendix J, Table 6.3).

There was no noticeable difference in how often online facilitation tasks were employed among respondents with different years of experience on a regular basis in the online classroom. When asked what other learning tasks facilitators were using on a regular basis in the online classroom (open-ended question, item 4), the following tasks were remarked on: editorial workshops (online workshopping of student feature stories) and online role-play. It is also viewed as important to contextualise the learning activity, and situated learning was commented on by a fulltime lecturer (Respondent 53):

'The online learning activity is one part of a studio practice. Therefore, most assignments are completed in a studio environment.'

Online activities via web conferencing tools, such as Adobe Connect, GoToMeeting, and/or Blackboard Collaborate, Pinterest, Instagram and Google Apps like Docs and Sites, discussion board activities -conversations and discussions as well as sharing work for commentary were also mentioned.

6.5 Social learning interaction in online academic practice

Question 5: If you had to give advice to a novice (new) online tutor on how to promote student engagement in an online classroom, what would you rate as effective advice?

Respondents were asked to rate the following ten items regarding effective advice for online facilitation to promote engagement in an online classroom: 1) build lecturer-to-student relationship; 2) encourage student-to-student relationships; 3) establish learner support such as 'how to' files and frequently asked questions; 4) create a thread on the discussion forum for informal social interaction; 5) include small-group activities; 6) provide a blog where students can share reflections on their learning experiences; 7) create a wiki page where students can work together on a project; 8) conduct a webinar for real-time student discussion; 9) structure a series of online quizzes based on a case study; and 10) include video presentations of lectured materials. Figure 6.7 shows the frequency of response rates for the 10 items regarding effective advice of online facilitation to promote student engagement in an online classroom.

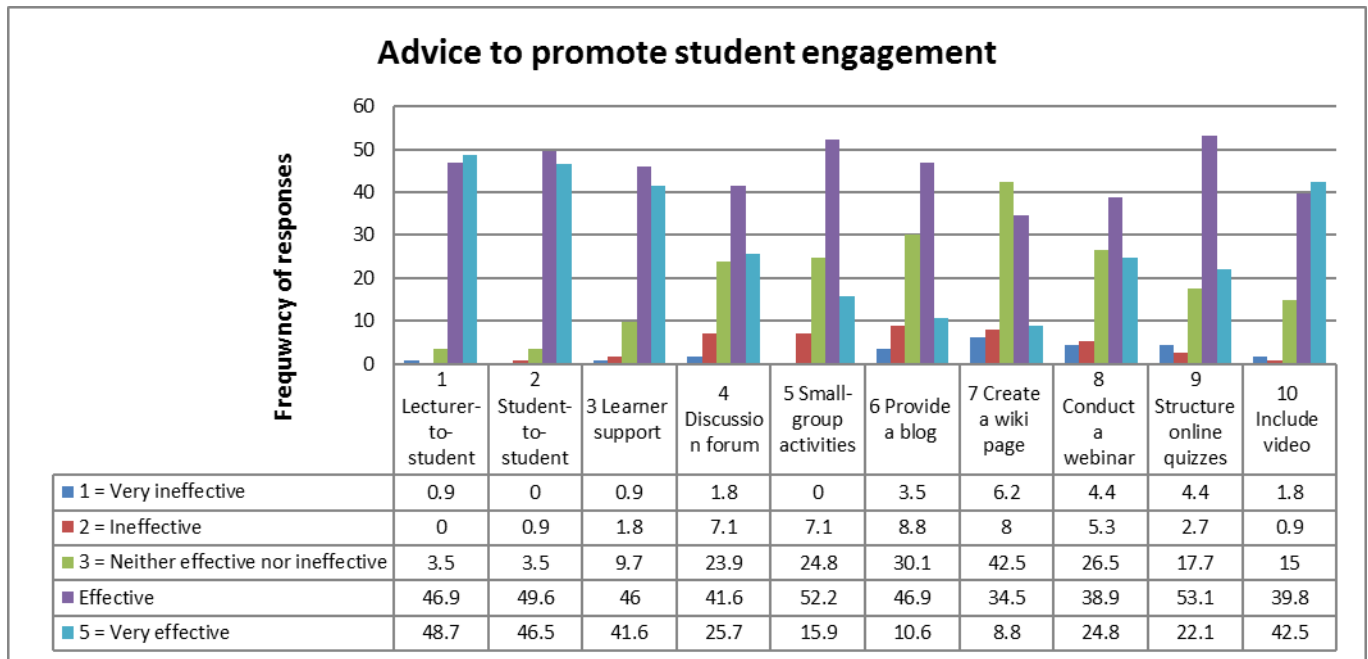


Figure 6.7: Advice to promote student engagement in an online classroom

All items had means above 3. Items 1, 2, 3 and 10 had means over 4, indicating respondents viewed these items as moderately to highly effective approaches of online facilitation to promote student engagement in an online classroom, as shown in Figure 6.8.

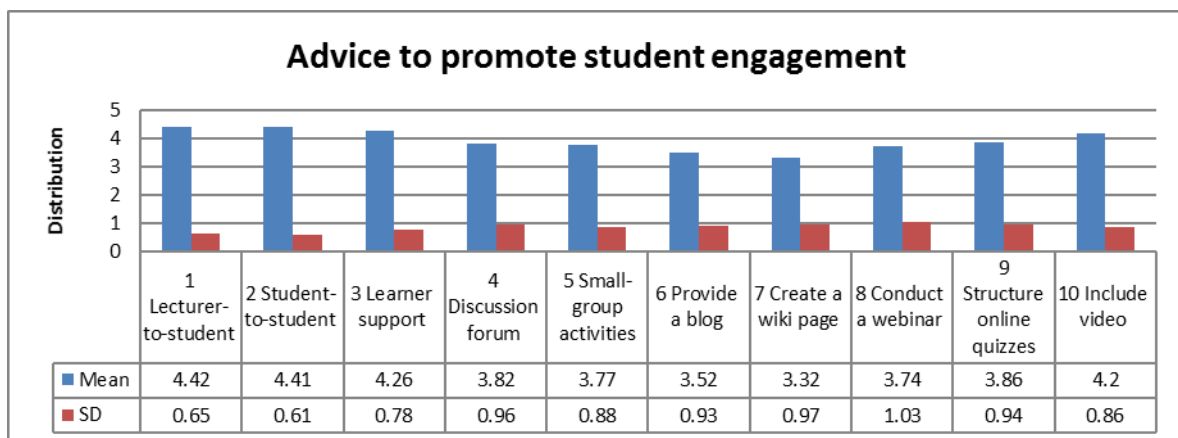


Figure 6.8: Mean and standard deviation of advice to promote student engagement

The items related to social learning interaction, namely student-to-student ($M = 4.41$), lecturer-to-student ($M = 4.42$) as well as learner support ($M = 4.26$), rated highest, which further shows how much of a priority these items are to creating an engaging and supportive learning space.

6.5.1 Comparing variables for advice to promote student engagement

The items regarding effective advice for online facilitation to promote student engagement in an online classroom were further analysed by levels of education, years of experience, and location. It appears that respondents with different levels of education had significantly different perceptions regarding: item 1) Build lecturer-to-student relationship ($p = 0.018$); item 4) Create a thread on the discussion forum for informal social interaction ($p = 0.014$); item 5) Include small-group activities ($p = 0.000$); and item 10) Include video presentations of lectured materials ($p = 0.020$) (Appendix J, Table 6.4).

Different years of experience did not have an impact on perceptions regarding the effectiveness of encouraging student-to-student relationships to promote student engagement in an online classroom. Respondents were also asked to share any other advice that they would like to provide an online tutor (open-ended question, item 6) and the following collated responses were received. A course coordinator (respondent 5) commented that the first week is the most important in terms of engaging students, and also that it is important to extend online communication to tools such as discussion board ice-breaker activities:

'The first week is always best managed with ice breakers that involve perhaps some discussion board skills like posting a picture that is a representation of their

personality etc. This not only helps them to start communicating but also helps them to become familiar with the functions of posting.'

The flipped classroom, namely getting students to comment on watching videos, readings and researching articles prior to formal lectures, also received a fair amount of comments, such as the following by a sessional lecturer (respondent 45):

'Flip the classroom and get students to reading, watching videos, researching, reflecting etc. prior to the online sessions so that the online interactions are enriched by the underpinning knowledge.'

A sessional lecturer (respondent 52) stated that it is essential to lead by example if you want to collaborate:

'Lead by example. If you want collaboration, start it, and praise it. '

Respondents also commented further on online collaboration, support and motivation and showing students that you care, which is important for effective social interaction.

.6 Knowledge-sharing space in academic online practice

Question 7: Please rate the effectiveness of the following activities to encourage students to find solutions to real-life problems in the online classroom?

Respondents were asked to rate the following ten items regarding effective activities of online facilitation to encourage students to find solutions to real-life problems in an online classroom: 1) case studies; 2) field work experiments; 3) virtual laboratory task; 4) research activities; 5) virtual simulations; 6) online games; 7) quizzes; 8) virtual tours; 9) written assignments; and 10) examinations. Figure 6.9 shows the survey results of the 10 items regarding effective activities of online facilitation to encourage students to find solutions to real-life problems.

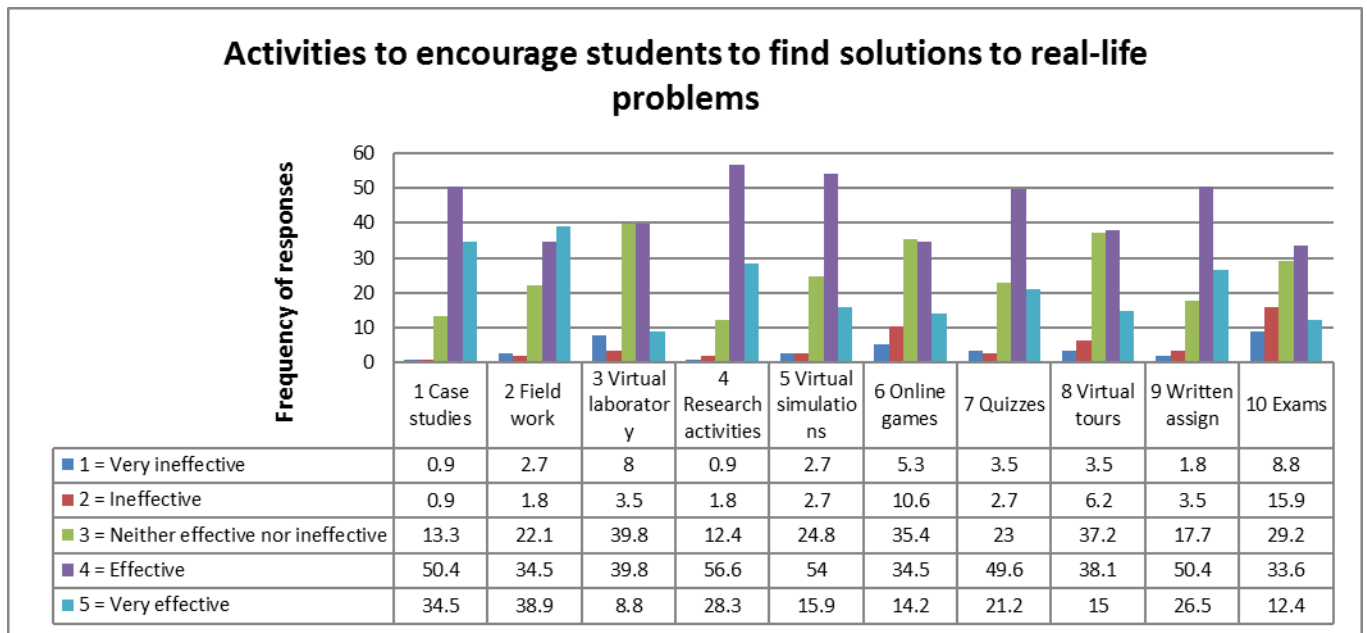


Figure 6.9: Activities to encourage students to find solutions

All items had means above 3. Items 1, 2 and 4 had means over 4, indicating respondents viewed these items as moderately to highly effective activities for online facilitation to encourage students to find solutions to real-life problems. The remaining items were considered as moderately effective activities for online facilitation to encourage students to find solutions to real-life problems by the respondents, as shown by Figure 6.10.

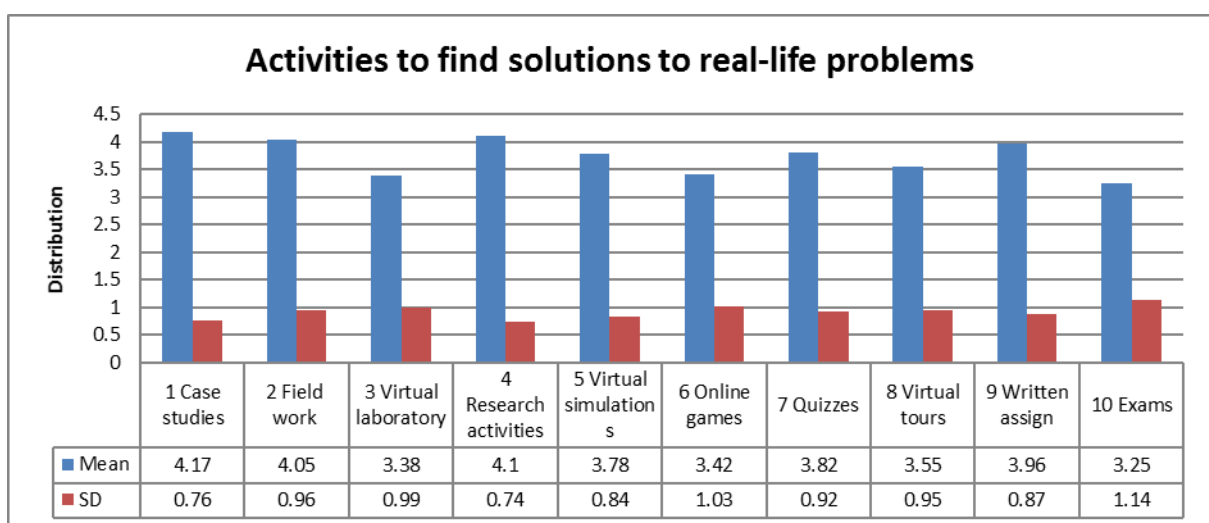


Figure 6.10: Mean and standard deviation for activities to find solutions

Situated and contextualised learning such as case studies ($M = 4.17$), field work ($M = 4.05$) and research activities ($M = 4.10$) are viewed by respondents as contributing to authentic scenarios that help students find solutions to real-life problems, whereas examinations ($M = 3.25$) were viewed as less important. An online tutor (respondent 47) observed that these types of activities over time are beneficial to both students and tutors in helping them grow and develop ideas and concepts:

'Seeing students' ideas and understanding of concepts develop over time, seeing them interact with and support each other, is very rewarding.'

6.6.1 Comparing variables for activities to find solutions to real-life problems

The items regarding effective activities of online facilitation to encourage students to find solutions to real-life problems were analysed by levels of education, years of experience, and location.

It appears that respondents with different levels of education had statistically significantly different perceptions regarding online games ($p = 0.001$). In particular, online games were regarded as a more effective activity of online facilitation to encourage students to find solutions to real-life problems for respondents with a Master's degree ($M = 3.89$, $SD = 0.96$) than for respondents with a professional/doctoral degree ($M = 2.94$, $SD = 1.09$) ($p = 0.001$) (Appendix J, Table 6.5). There were no differences in any items regarding effective activities for online facilitation to encourage students to find solutions to real-life problems in an online classroom, among respondents with different years of experience.

6.7 Meta-cognitive load in online academic practice

Question 8: The students are required to work collaboratively in the online classroom to produce a group work assignment. Which of the following would you rate as an important facilitation task?

Respondents were asked to rate the following five items regarding the importance of the facilitation tasks in encouraging students to work collaboratively: 1) allocate marks to individual students; 2) promote exchange of student ideas; 3) provide feedback on student progress; 4) encourage students to assess each other's contribution; and 5) support students on how to use a new technology.

Figure 6.11 shows the survey results of these items.

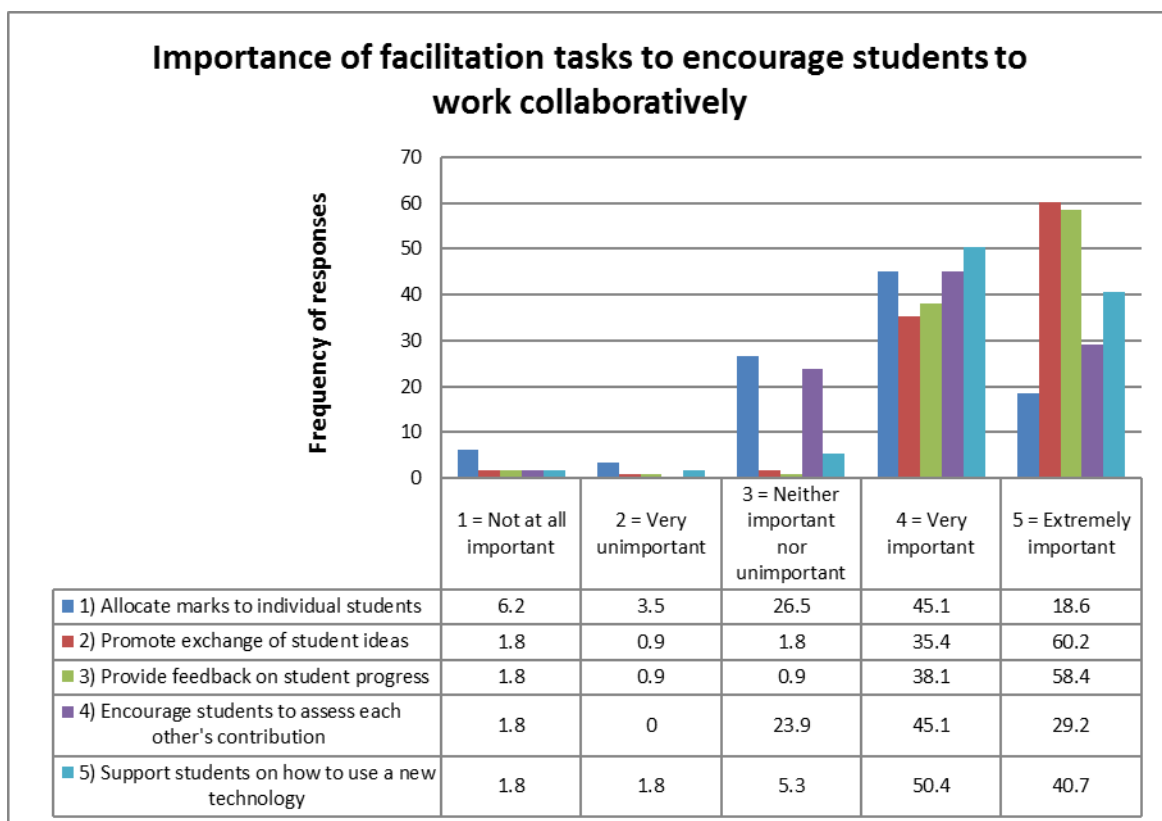


Figure 6.11: Facilitation tasks to encourage students to work collaboratively

All items had means above 3 and items 2, 3 and 4 had means above 4. The results suggested that respondents viewed all items as important facilitation tasks to encourage students to work collaboratively, as illustrated by Figure 6.12.

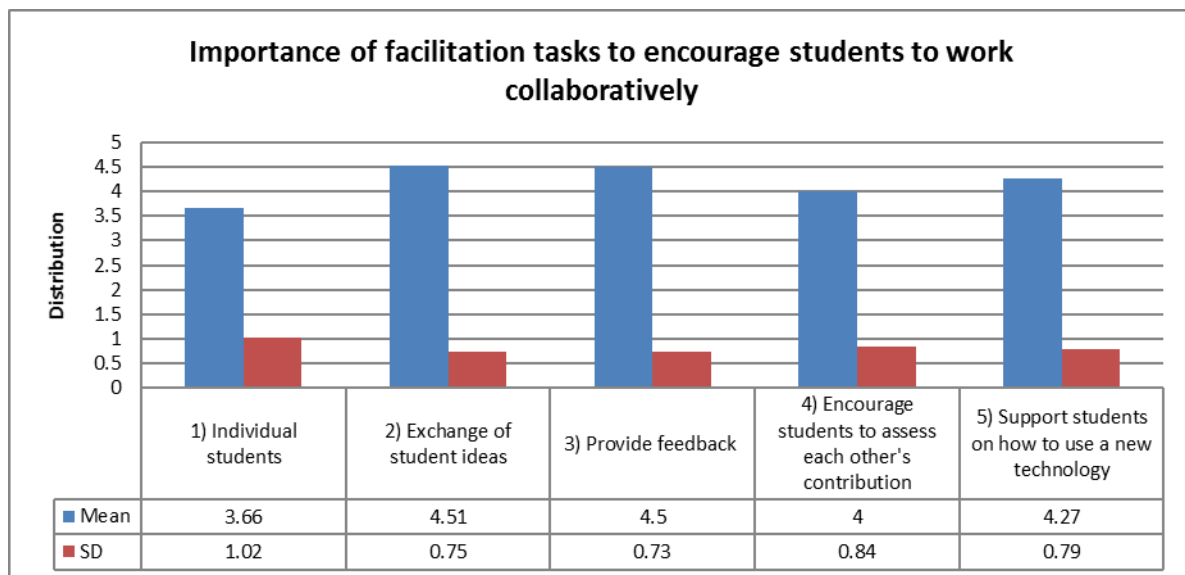


Figure 6.12: Mean and standard deviation for facilitation tasks to encourage students to work collaboratively

6.7.1 Comparing variables for encouraging students to work collaboratively

The items regarding the importance of facilitation tasks to encourage students to work collaboratively were analysed by levels of education, years of experience and location. According to the analysis results, there were no statistically significant differences in any items (Appendix J, Table 6.6).

6.8 Knowledge construction and transference in academic online practice

Question 9: Which of the following actions would you prefer in your online classroom?

Respondents were asked to rate the following five items regarding the preferable actions in the online classroom: 1) students spontaneously organise their online communication methods; 2) students present assignments in various ways; 3) students have a choice if they want to work in groups or individually; 4) students make use of the social media that they are comfortable with; and 5) include a face-to-face teaching component.

Figure 6.13 shows the survey results of these items regarding the preferable actions in the online classroom.

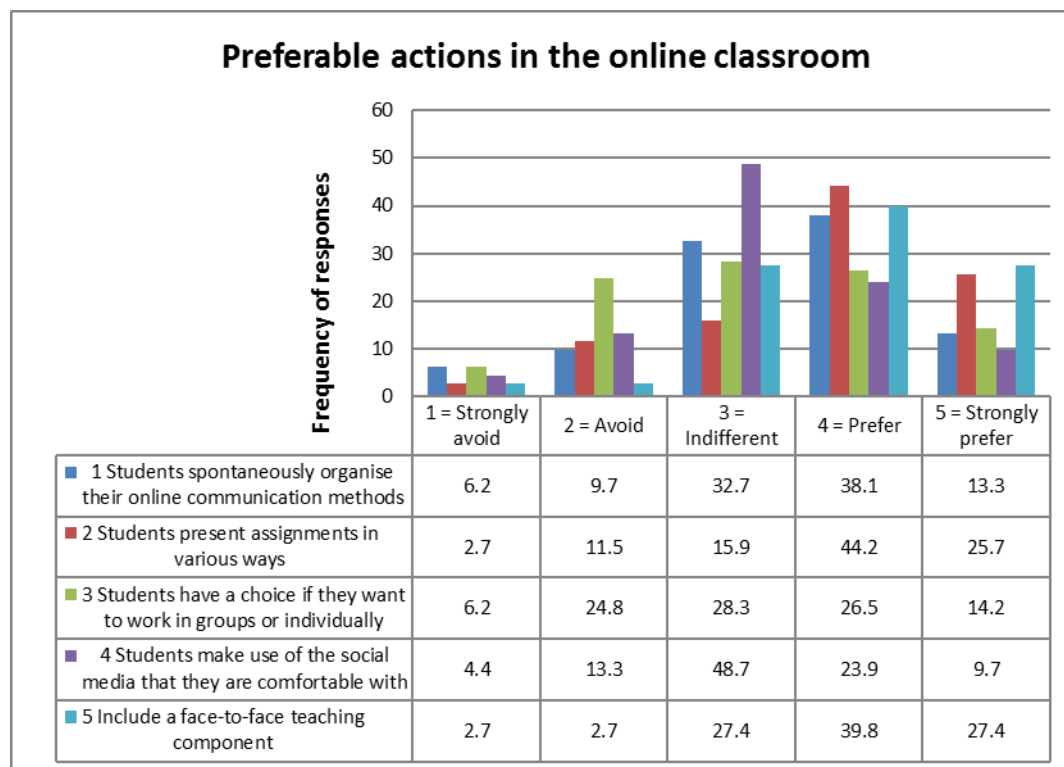


Figure 6.13: Preferable actions in the online classroom

All items had means above 3, as shown in Figure 6.14. The results suggested that respondents viewed all items as preferable actions in the online classroom.

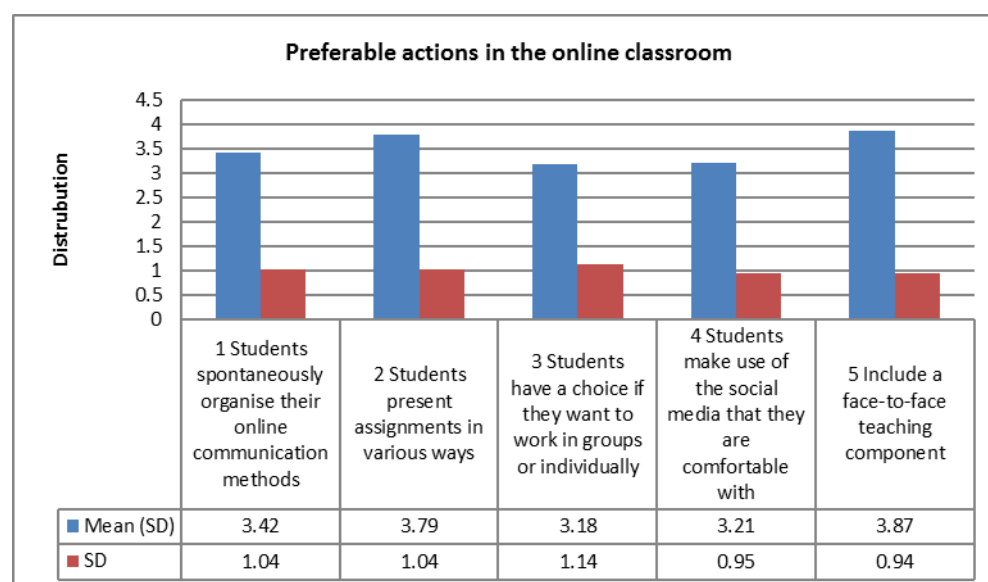


Figure 6.14: Mean and standard deviation for preferable actions in the online classroom

The item that received the highest mean rating was to include a face-to-face teaching component ($M = 3.87$) within the online classroom. Despite the advancements in technology within eLearning, it remains difficult and often frustrating to determine student engagement. A fulltime lecturer (respondent 28) complained that it is more difficult to determine student engagement in an online setting than in a face-to-face environment:

‘At least we know when on-campus students don't turn up.’

The perception remains amongst academics that some disciplines do not lend themselves towards the online environment, as a fulltime lecturer (respondent 98) commented:

‘The discipline I teach into has better outcomes with face-to-face tutorials. Online is harder as the work produced by students (drawings etc.) is not easily accessed on a computer.’

The lowest rated item as a preferable action in the online classroom was for students to have a choice if they want to work individually or in a group. The individuation or personalisation of the online environment requires a level of technical expertise that is not yet available or feasible within eLearning, especially when dealing with large student cohorts.

6.8.1 Comparing variables for preferable actions in the online classroom

It appears that respondents with different levels of education had different perceptions regarding students presenting assignments in various ways ($p = 0.036$), and including a face-to-face teaching component ($p = 0.024$). The results as shown in Appendix J, suggested that respondents with different years of experience had different perceptions regarding students having a choice if they want to work in groups or individually ($p = 0.043$). In particular, the results of pairwise comparisons using Dunn's procedure suggested that respondents with 1-2 years of experience ($M = 3.50$, $SD = 0.95$) preferred students having a choice if they want to work in groups or individually compared with respondents with 6-9 years of experience ($M = 2.64$, $SD = 1.14$) ($p = 0.043$) (Appendix J, Table 6.6).

It seems that the underlying assumption of the facilitator being the main person to provide feedback on student progress still prevails. Within higher education, more promotion could occur on the benefits of peer review and feedback. Academic professional development in regards to emergent technology support systems could also further encourage the implementation of peer review systems (Mavroudi et al., 2015) that could support knowledge construction.

6.9 Importance of organisational support within online academic practice

Question 10: What would you consider important organisational support for developing a successful online classroom?

Durable constructivist strategies need to assist with the design, development and implementation of quality eLearning programs (Thompson et al., 2013). Respondents were asked to rate the following five items regarding important organisational support for developing a successful online classroom: 1) academic professional development; 2) work load model for online delivery; 3) organisational policy; 4) sufficient technical support; and 5) effective program evaluation. The survey results of these items regarding the importance of organisational support are shown in Figure 6.15.

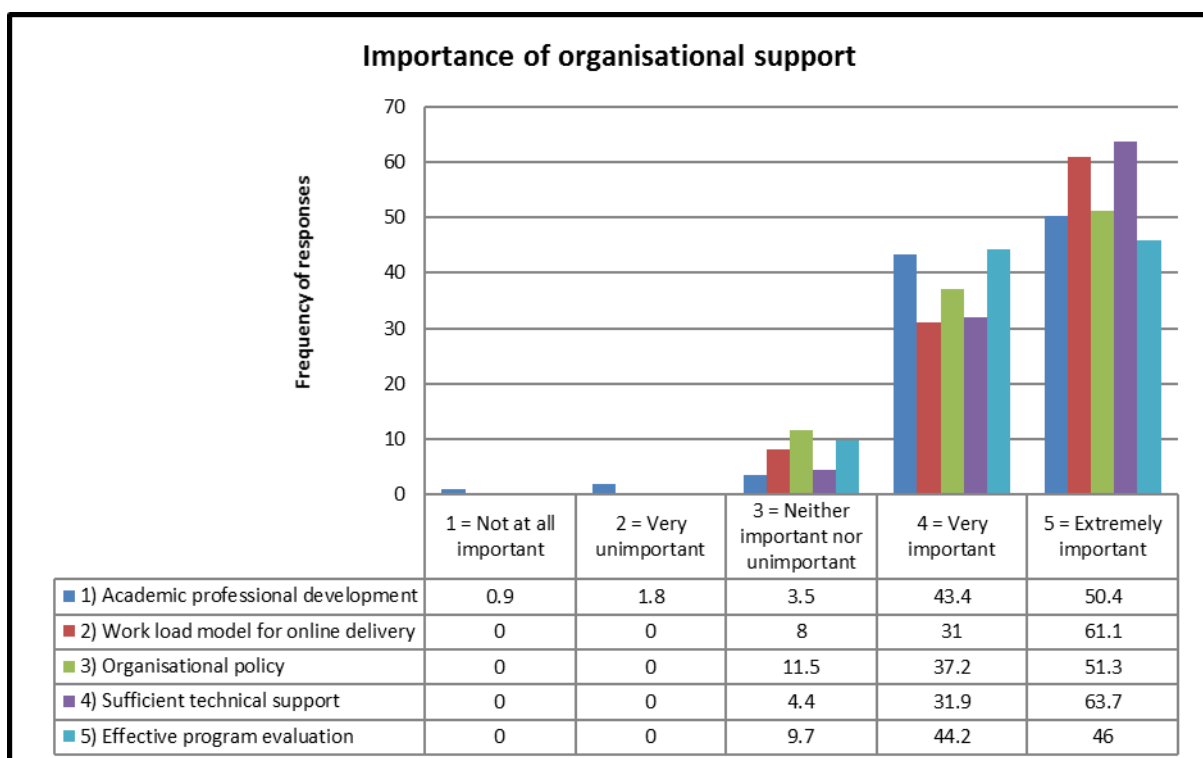


Figure 6.15: Importance of organisational support

All items had means above 4, indicating that respondents viewed all items as important organisational support for developing a successful online classroom, as illustrated by Figure 6.16.

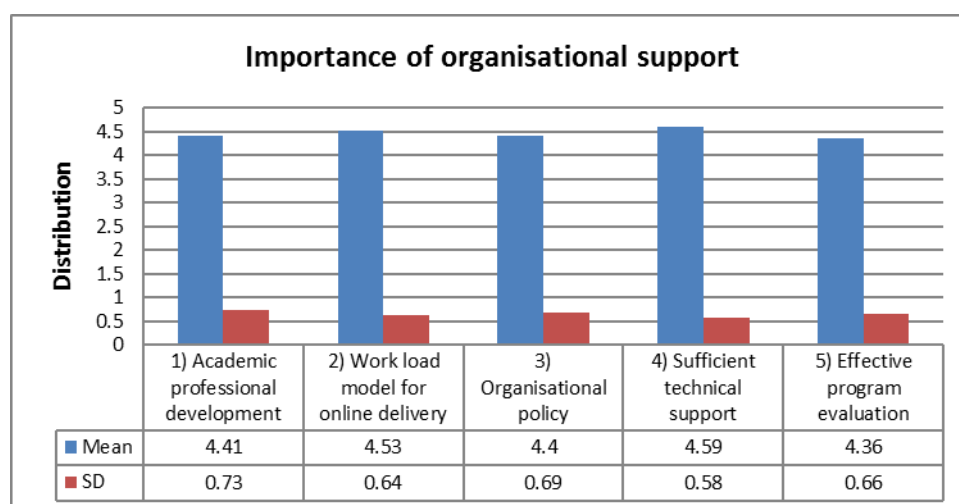


Figure 6.16: Mean and standard deviation for organisational support

Respondents with different levels of education had different perceptions regarding academic professional development ($p = 0.025$) (Appendix J, Table 6.7 and in particular, the results of pairwise comparisons using Dunn's procedure suggested that academic professional development was more important for respondents with a Master's degree ($M = 4.69$, $SD = 0.47$) than for respondents with a Bachelor's degree ($M = 4.12$, $SD = 0.93$) ($p = 0.040$). The results of Appendix J, suggested that respondents with different years of experience had different perceptions regarding work load model for online delivery ($p = 0.025$). In particular the results of pairwise comparisons using Dunn's procedure suggested that a work load model for online delivery was more important for respondents with 10+ years of experience ($M = 4.81$, $SD = 0.51$) than for respondents with 3-5 years of experience ($M = 4.33$, $SD = 0.72$) ($p = 0.027$).

This is unsurprising as the current work load model for online learning as set by Australian higher education institutions is often unrealistic weighed up against the demands placed on the online learning facilitator (Oliver & Gourke, 2007). This may negatively impact social learning interaction and social learning presence, as those two learning design elements are supported by effective online facilitation.

6.10 Respondents' sentiments about online learning

Respondents were asked to share their feelings about teaching within an eLearning environment (Item 11: Please indicate what describes your feelings the most?), as illustrated by Figure 6.17.

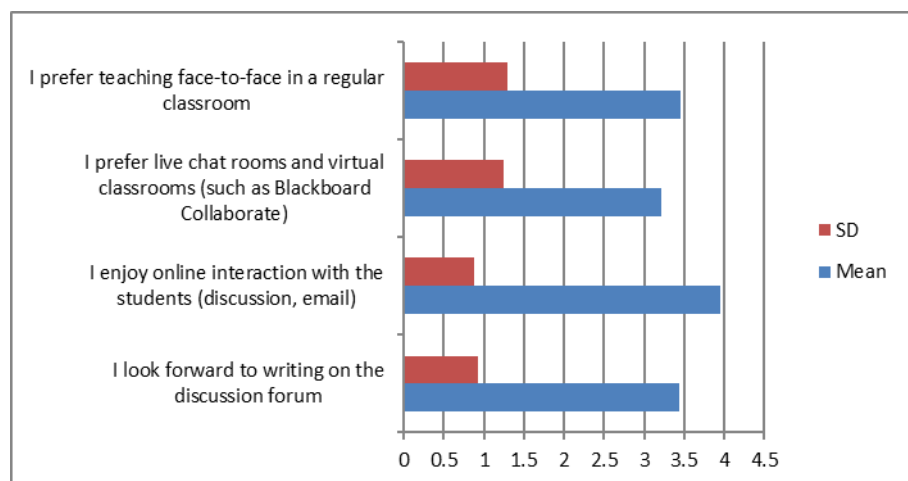


Figure 6.17: Respondents' sentiments about online learning

Most enjoyable appears to be the asynchronous interaction with students (discussion, email) ($M = 3.95$, $SD = 0.88$) as opposed to the synchronous online communication ($M = 3.22$, $SD = 1.24$). A high number of respondents ($M = 3.44$, $SD = 0.93$) also look forward to writing on the discussion forum. Synchronous communication is often logistically difficult to organise, and despite technological advances such as live video and audio streaming, remains unreliable.

It is also easier for facilitators to respond to queries on the discussion forums, as there is more time for reflection and more opportunity for one-to-many replies.

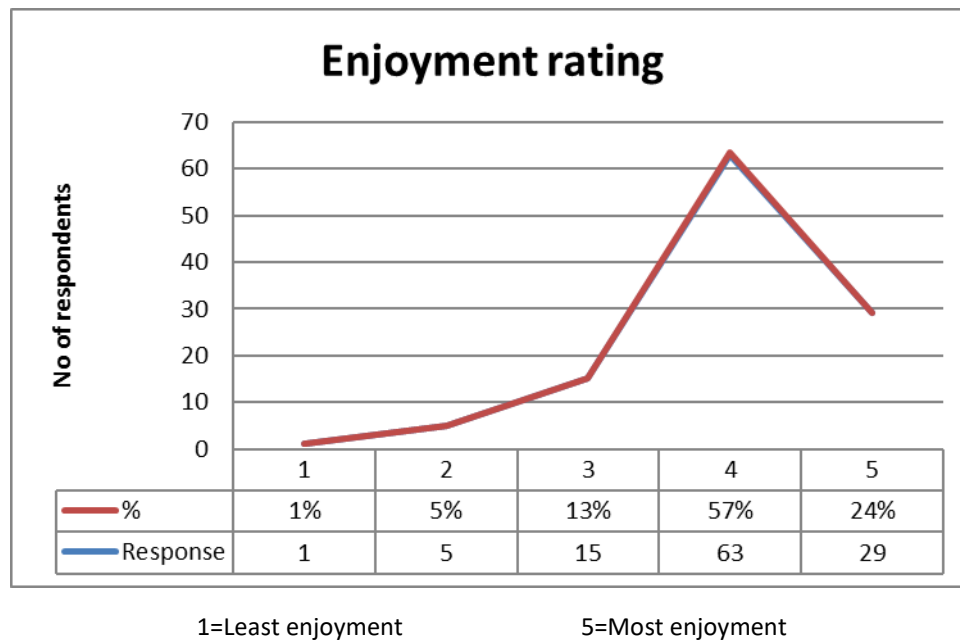


Figure 6.18: Rate your enjoyment level for teaching online

Overall it appears that respondents do rate their enjoyment levels of teaching online quite highly, averaging at a 4 rating for 50% of the respondents. This may also be due to the fact that for many of the respondents, this was their chosen employment opportunity.

Respondents were asked how likely they were to recommend online learning to a student or colleague.

It appears that respondents are likely to recommend it, with a total of 71% of respondents rating the scale between seven and ten, as illustrated by Figure 6.19.

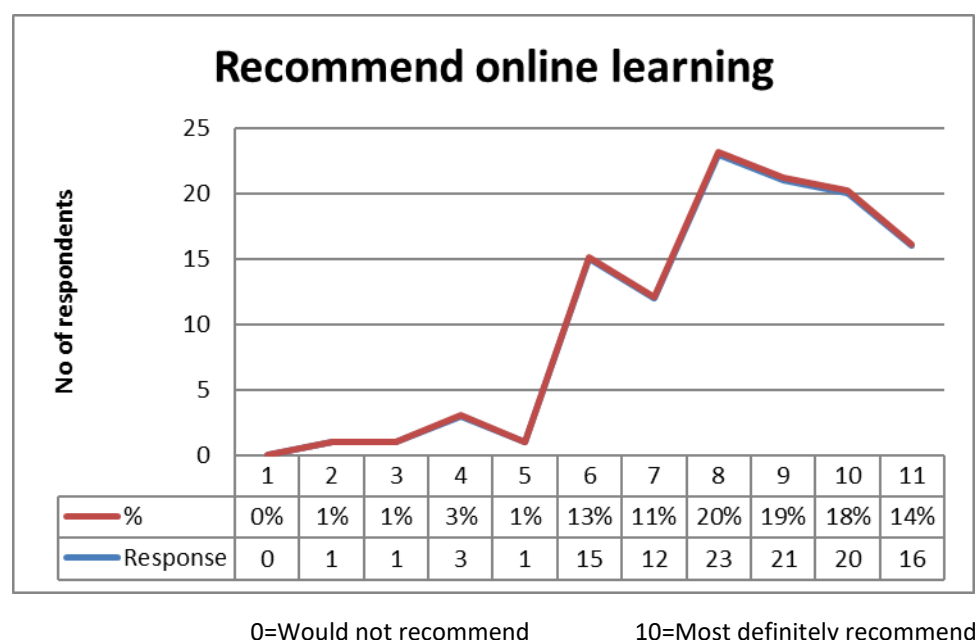


Figure 6.19: Recommend online learning to a student or colleague

Despite misgivings and concerns about online learning, it appears that academics do have the perception that eLearning can be useful in providing opportunities for learning. An online tutor (respondent 102) remarked that it is enjoyable to help students who may otherwise have been unable to attend university and provide them with a positive experience. First time students require the most support to continue and complete their studies:

'I still maintain that first year is by far, the hardest year. It is extra difficult if you are attempting it online. This is why so much care needs to be taken to support these types of students.'

Figure 6.20 indexes the themes that emerged when respondents were asked what they enjoyed most about teaching online.

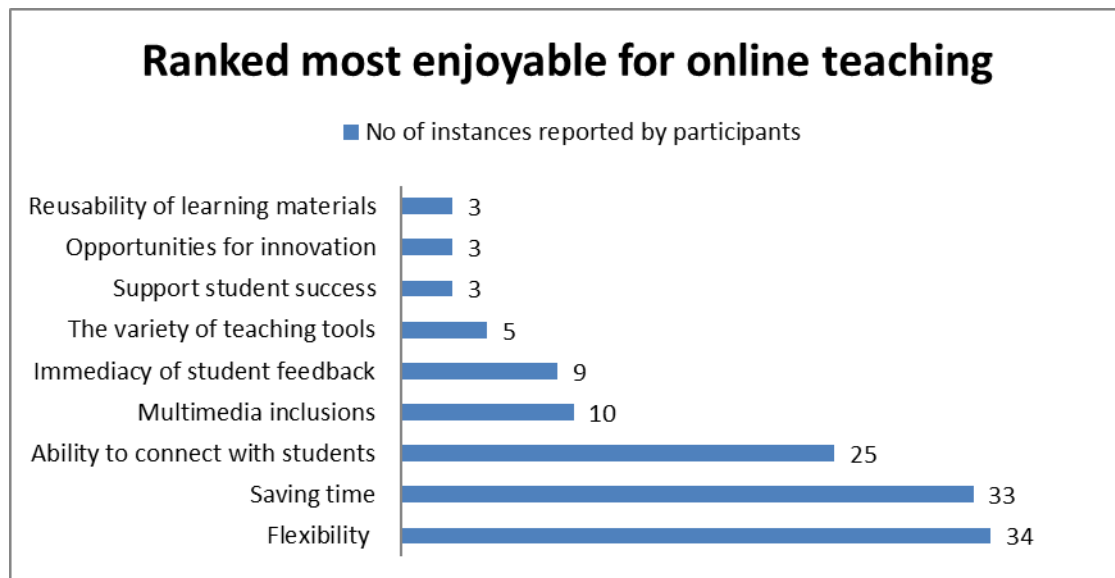


Figure 6.20: Ranked most enjoyable for online teaching

Multimedia inclusions refer to items such as video, voting functions and quizzes. The technology can facilitate ease of use if the learning environment is set up at the start of the semester. A program manager (respondent 2) observed that it is easy to set work up in advance and not to be concerned with students who are unable to attend class due to delays or work and family commitments.

An important aspect of online learning is the ability to interact with students in ways that are not always possible in a face-to-face classroom situation. A fulltime lecturer (respondent 47) commented that it is satisfying to see students grow in confidence.

Respondents rated the flexibility of online teaching very highly. A sessional lecturer (respondent 50) remarked that the flexibility and methods of communication are much more varied when online delivery is included:

‘Flexibility, time to develop and solve problems when complex questions or situations arise. Number of communication technologies that can be used to communicate with students.’

Technology seems to pose challenges for academic staff, but it is not always seen in a negative light. A sessional lecturer (respondent 49) observed that the challenge remains to create effective and enjoyable learning experiences within the online delivery mode. A fulltime lecturer (respondent 47) commented that in his opinion the main advantage of online delivery is that everything is recorded and can be referred to over time.

‘Everything is recorded and therefore [it is] a very effective way of building resources over time and keeping them organised with minimal effort. [It] also facilitates compliance with various regulatory requirements.’

Figure 6.21 indexes the themes that emerged when respondents were asked what they rated least enjoyable for online teaching.

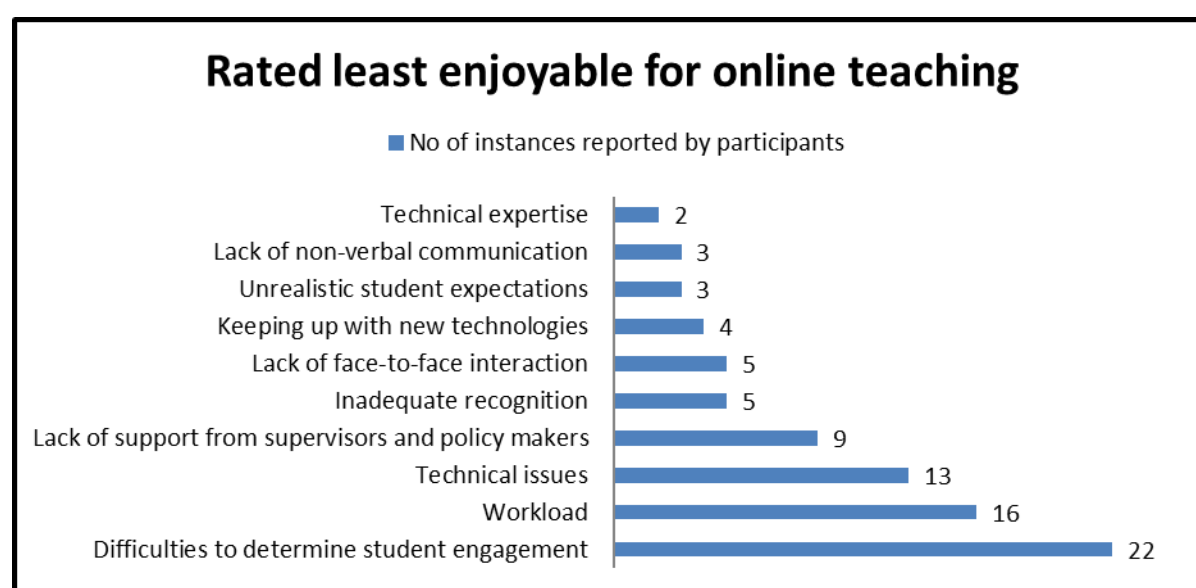


Figure 6.21: Rated least enjoyable for online teaching

The online environment can sometimes feel isolating and distant from real-life encounters.

A program manager (respondent 3) observed that he missed the light and informal face-to-face social interaction with students:

'I miss the banter with students in the corridors, in the coffee breaks, and some of the ad hoc topics that can come up in a physical classroom.'

Organisational support and recognition was a theme that emerged again, and a sessional lecturer (respondent 50) remarked that universities often do not recognise the time and effort it takes to interact with students online, and how demanding student emails and communication may be:

'My experience of online teaching is that it takes more rather than less time compared to face-to-face teaching. The way in which payment is allocated tends to suggest that universities do not expect (and do not want to encourage) all students to participate in online units. When you have one tutor/convenor dealing with 100-200 students, there is no way that tutor/convenor can interact with all of them equally.'

6.11 Summary

In order to investigate learning design elements for an eLearning framework that promotes the use of emerging technologies for social networking and collaborative knowledge construction, a further quantitative data collection and analysis was employed. The purpose of the quantitative phase was to investigate how social networking tools and active knowledge-making are currently executed within the Australian online higher education sector.

Chapter 6 summarised the findings from the electronic survey that was distributed to academic practitioners in the field of eLearning and within the context of Australian higher education. The examples contained in the survey questions were drawn from data collected by the semi-structured interviews, as documented in Chapters 4 and 5.

Findings indicate that respondents recognised the importance for the lecturer or tutor to establish a strong social presence within the online environment, such as by providing biographical data and facilitating the discussion forum. Although the individual written assignment received the highest nomination for frequently used tasks, it is encouraging to observe that more interactive and problem-based techniques such as online quizzes and group work projects are gaining prominence. Online social media tools such as Adobe Connect, GoToMeeting, Blackboard Collaborate, Pinterest, Instagram, Google Apps like Docs & Sites, discussion board activities and sharing work for commentary were also mentioned as frequently used tools. The flipped classroom, namely getting students to comment on watching videos, readings and researching articles prior to formal lectures, also received a fair amount of support. Situated and contextualised learning such as case studies ($M = 4.17$),

field work ($M = 4.05$) and research activities ($M = 4.10$) are viewed by respondents as contributing to authentic scenarios that help students find solutions to real-life problems. Despite the advancements in technology within eLearning, it remains difficult and often frustrating to determine student engagement. The perception remains amongst academics that some disciplines do not lend themselves towards the online environment. The individuation or personalisation of the online environment requires a level of technical expertise that is not yet available or feasible within eLearning, especially when dealing with large student cohorts.

The current work load model for online learning as set by Australian higher education institutions is often unrealistic weighed up against the demands placed on the online learning facilitator. This may negatively impact social learning interaction and social learning presence, as those two learning design elements are supported by effective online facilitation.

CHAPTER 7 FRAMEWORK FOR CO-CONSTRUCTION OF KNOWLEDGE WITHIN ELEARNING

7.1 Introduction

This chapter presents a discussion of the requirements for a framework to guide learning design that supports social networking and co-construction of knowledge derived from the findings of the qualitative and quantitative research data collection process.

The main research question posed by this study is to investigate the critical learning design elements that are informed by a constructivist instructional design approach to determine how these elements could be optimised within the Australian eLearning higher education context. The study identified learning design elements of social constructivism that received substantial empirical data to show a significant impact on student engagement, and a strong empirical correlation between learning design element and social networking. The eLearning framework for social networking and co-construction of knowledge presents the description, categories and recommended learning activities for each of the learning design elements.

7.2 Learning design element 1: Social learning presence

7.2.1 Promote meaningful social interaction in the online environment

Educational institutions and online instructors face the challenge of building and sustaining student trust in online learning environments (Wang, 2014). A lack of meaningful reasons to interact can exist within the course, especially socially (e.g. a focus on getting qualifications, not making new friends). Results from this study indicated that whilst some students preferred to work by themselves and not be restricted to a specific place at a certain time, synchronous communication added another layer of depth to social interaction.

It is important for the academic to be present and visible within the online learning environment as this may make students feel less isolated. Respondents with different levels of education, rather than different years of experience, had different perceptions regarding facilitating online learning tasks. Academics who themselves had more exposure to a variety of learning tasks were better able to model to their students different learning experiences.

7.2.2 Reflect socially and affectively on learning progress

Networked learning and the exponential growth of knowledge need to be considered when presenting and engaging with information (Downes, 2012) as opposed to just presenting the information. Blogs, wikis and other social media tools can now be leveraged to support peer-evaluation and critique (Cochrane, 2008) and meaningful collaborative networking such as problem-based projects (Henderson et al., 2015). Academics seem to prefer technologies for their usefulness and user-friendliness rather than simply choosing the latest technology.

The results of pairwise comparisons using Dunn's procedure suggested that group work projects were employed significantly more often for respondents with a professional/doctoral degree ($M = 3.52$, $SD = 1.25$). Again, educational levels rather than years of experience played a role in the selection of more complex online tasks.

One of the ways that academics can moderate online discussions is to set up rules for online interaction. Such rules provide boundaries, can be enforced to safeguard against online misconduct and bullying behaviours, and may assist with building trust (Wang, 2014). Student cohorts sometimes do not want to participate in activities such as online discussions and group projects unless it is part of a summative assessment. Respondents (Chapter 4) agreed that heavy content with little opportunity to interact with others will adversely affect social learning presence.

An important role of the online facilitator is to provide constructive feedback on assignments (C. Moore & Signor, 2014). Within the eLearning space, this feedback with the purpose of formative assessment (commenting constructively on learning progress) extends not only to written assignments, but also to all online communications such as blogs, wikis and discussion forums. The main advantage of online communications is that many students may benefit from the feedback, instead of just one student.

Findings from this study for the learning design element ‘social learning presence’ are summarised by Figure 7.1.

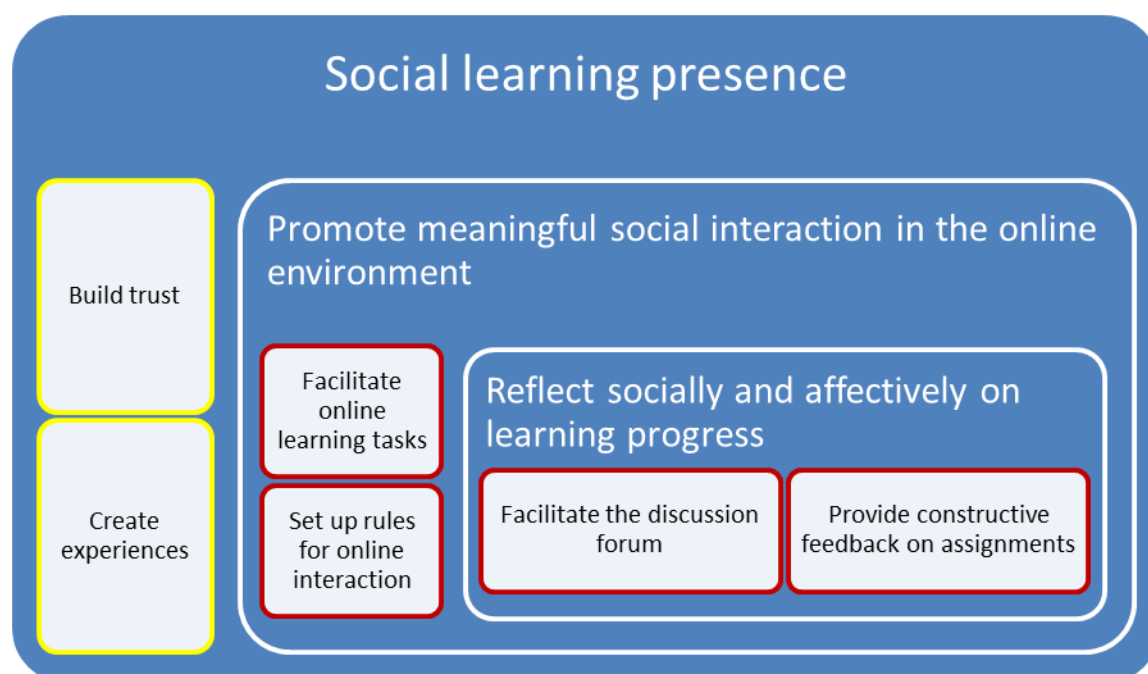


Figure 7.1: Summary of social learner presence

7.3 Learning design element 2: Social learning interaction

7.3.1 Solve problems and internalise learning

The design of the online learning interaction supports and contributes to the creation of a social learning system (Francisco, 2013). Students are encouraged to assume responsibility for their own learning, and that includes effective collaboration and meaningful engagement. Students developing constructive solutions to real-life problems enables them to problem-solve and internalise learning (Cope & Kalantzis, 2013).

Findings from this study (Chapters 5 and 6) cautioned that the main obstacle for implementing social media was the rapidly evolving and changing nature of social media.

Having to keep up-to-date with rapidly evolving social media and using it appropriately may be an obstacle as that is very time consuming and demanding for both academics and students (Ertmera, Ottenbreit-Leftwichb, Sadikb, Sendururc, & Sendururc, 2012).

Whatever the technology that is used, the focus needs to remain on building the student-to-student and lecturer-to-student relationships. If the technology that is chosen is not user-friendly and is inhibiting to this relationship, then it is better to choose a simpler and easier communication tool such as the discussion forum. Multimedia components such as video lectures and webinars add a personal touch to the online environment and enhance the lecturer-student relationship.

7.3.2 Share individual perspectives on learning problems

Privacy and confidentiality may be problematic when setting the rules for engagement (as discussed in Chapters 5 and 6). Content that could potentially be inflammatory needs to be designed within a secure online environment when participatory design techniques are implemented. Students may not necessarily want to share information that may put them in an awkward position, expose them, or expose their mistakes. Academics are also often afraid of the 'unknown' part of social media. Some lecturers may also fear the 'loss of control' that they sometimes experience in the online environment. The relationship between the student and the lecturer becomes an important dimension to either relieve or exacerbate those fears and perceptions.

Respondents from the eDelphi expert panel (Chapter 4) agreed that within the learning environment, it needs to be made clear that individual opinions are valued and contribute to other students' understanding of the content. A learning environment needs to

encourage interaction amongst students so that learning experiences are embedded throughout the design of the subject.

Based on findings from the semi-structured interviews, it seemed that the fact that there was 'a human being somewhere in the picture' does help students to feel more connected to the learning environment, and feel more supported for the duration of their studies. eLearning can be a lonely place for both learners and academics, and purposefully encouraging informal social interaction such as a 'virtual coffee shop' thread on the discussion forum may address this isolation. Inclusion of small-group activities as opposed to having all the interaction on one large discussion forum makes it easier for students to build peer relationships.

Respondents rated including a face-to-face teaching component ($M = 3.97$, $SD = 0.94$) in terms of knowledge construction very highly, indicating that the role of the academic to guide learners is still viewed as extremely important. Face-to-face teaching can also be offered by means of webinars or virtual office (chat) in this context. The learning design element 'social learning interaction' is visually represented by Figure 7.2.

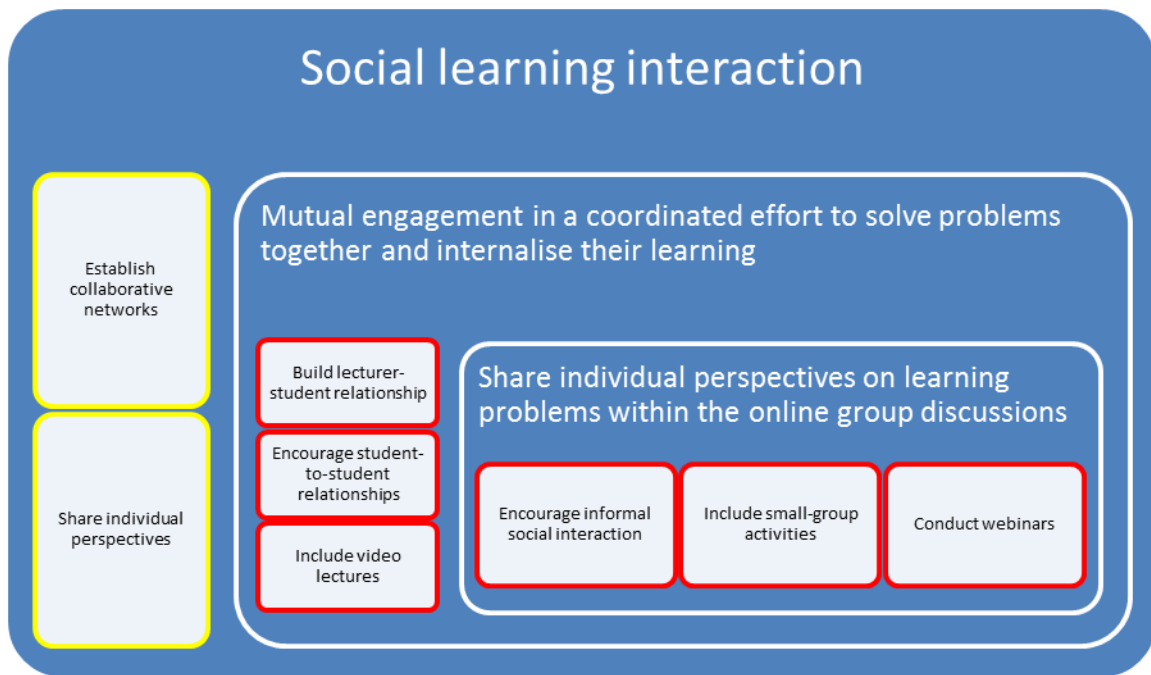


Figure 7.2: Summary of social learning interaction

7.4 Learning design element 3: Knowledge-sharing space

7.4.1 Build relationships and develop a sense of belonging

Knowledge-sharing space refers to how the online learning design is maximised to allow for sharing and distribution of knowledge in a safe space. All interviewees felt strongly that learning activities and assessments needed to be designed as authentic, meaningful and relevant to the learning that was taking place, also meaning that it closely resembled real-life experiences (Chapter 5). As it is almost impossible to predict which characteristics and what preferences students will have upon entering the course, findings from this study corroborate that personalisation and individuation of the learning environment is a way to cater to diversity. Although students do want the presence of the tutor or lecturer, they also do not necessarily seem to want the lecturer to dominate and drive the conversation. Often, time poor academic staff used the online environment to deliver resource-based learning knowledge of how to do things differently. The style of activity was an inhibitor to

developing a shared space where students feel safe to share. The ground rules for instructional design remained as follows: to understand the learner, to understand the learning environment, and to ensure that the design fitted the context (Chapter 5).

The learning environment may alternate between fully online mode or partially online, including workplace training, laboratory work, face-to-face tutorials or face-to-face lectures. Students ought to be actively engaged to find solutions to real-life problems, such as by conducting shared research activities and participating in virtual simulations (online scenarios).

7.4.2 Construct social meaning and vocabulary

Intercultural issues relate to the religious, historical, linguistic, aesthetic, gender and other more humanistic issues, sometimes crossing national boundaries. Examples of ways to address these issues include calendars that acknowledge religious time cycles, terminology reflecting popular culture and web search criteria that reflects cultural preferences (Marcus, 2015). Respondents agreed that to develop a learning community required that learners were there for a common purpose, e.g. undertaking a particular course. However, the demographics of online learners indicate that students are an increasingly diverse range of people effectively from anywhere in the world (Barnes, 2012). Online study is often a convenient way for people from a variety of backgrounds (e.g. mature age, working and post graduates) to study as it offers opportunities to study at times, spaces and places that suit them (Cope & Kalantzis, 2013).

This study observed that students in remote communities may still have only dial-up or low speed internet connections available, and this ought to be considered when designing the student requirements for access to activities and assessments. Situated activities that students can easily participate in and that would not require high-end multimedia design or fast internet connections are evaluation of case studies and reporting on field work experiments. These activities can be structured as small-group activities instead of individual activities to promote knowledge-sharing space.

The learning design element ‘knowledge-sharing space’ is illustrated by Figure 7.3.

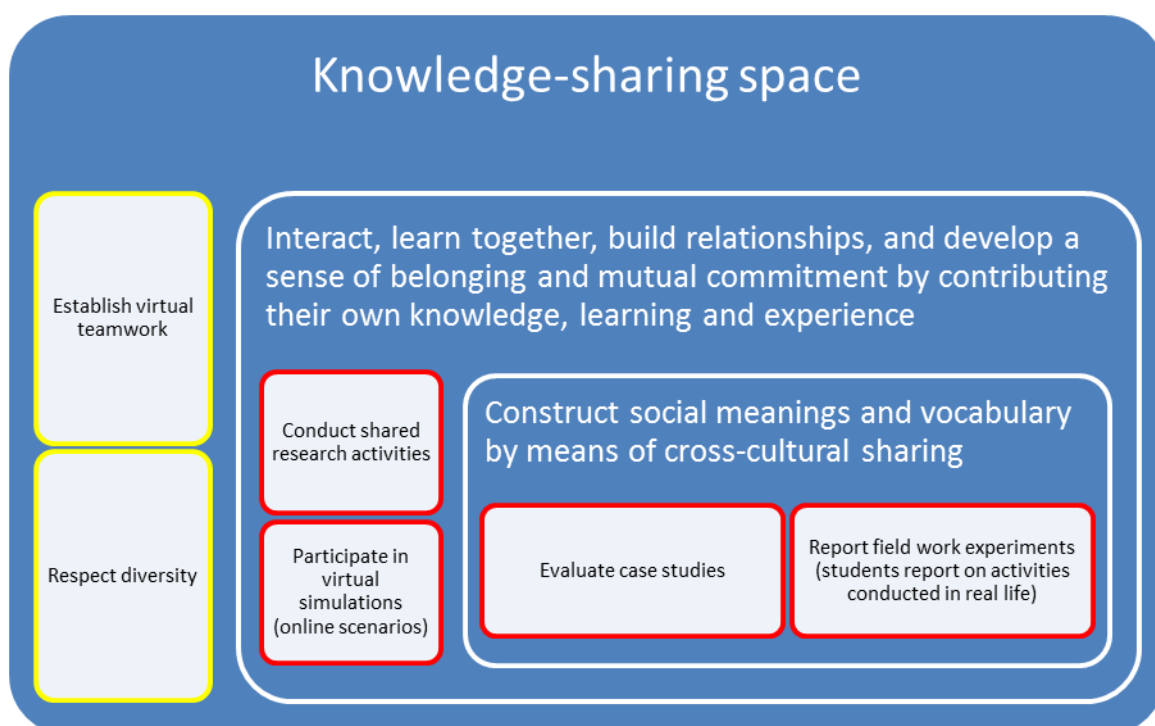


Figure 7.3: Summary of knowledge-sharing space

7.5 Learning design element 4: Meta-cognitive load

7.5.1 Self-monitoring and self-reward

Meta-cognition is a learner’s ability to be aware of their cognitive capabilities and use these capabilities to learn (O'Donnel et al., 2013). The criteria mega-cognitive load refers to the sequence and progression of the online learning experience in support of meta-thinking. Providing students with opportunities to co-construct their learning, extend their understandings of concepts and develop meta-cognition skills within their domains is essential. Learners actively select, organise, and integrate new information in working memory with already-existing knowledge in long-term memory, leading to the construction of new mental representations (Clark & Mayer, 2008).

The online learning activities and experiences are designed in a way that promotes knowledge construction and transference across various authentic scenarios ranging in complexity (J. Anderson, 2014). Respondents argued that to achieve this objective, learning outcomes and assessments need to be mapped across the curricula and the program.

Students may be viewed as information rich but experience poor (Thompson et al., 2013). eLearning courses that promote the exchange of student ideas, peer-evaluation and feedback within a group setting foster social networking competencies that mirror the students' future working environments. There is a strong need for active, enquiry based learning that advances 21st century employability skills in graduates, and therefore contextualisation of learning experiences is imperative.

7.5.2 Anticipate consequences of actions

Constructivism maintains that educators craft learning experiences into an active, experiential process in which learners create new ideas and think through problems. As the global economy expands, cross-cultural experiences and working virtually in teams grow in popularity. The design of learning activities and assessment tasks would need to address the incorporation of activities that enable team-based multi-cultural experiences. Towards this aim, it is important to encourage students to assess each other's contributions.

Help files need to be incorporated within the course design to support students on how to use a new technology. Students also need to be supported to set goals and weigh information sources in accordance with their validity and relevance to the learning content. The learning design element 'meta-cognitive load' is summarised by Figure 7.4.

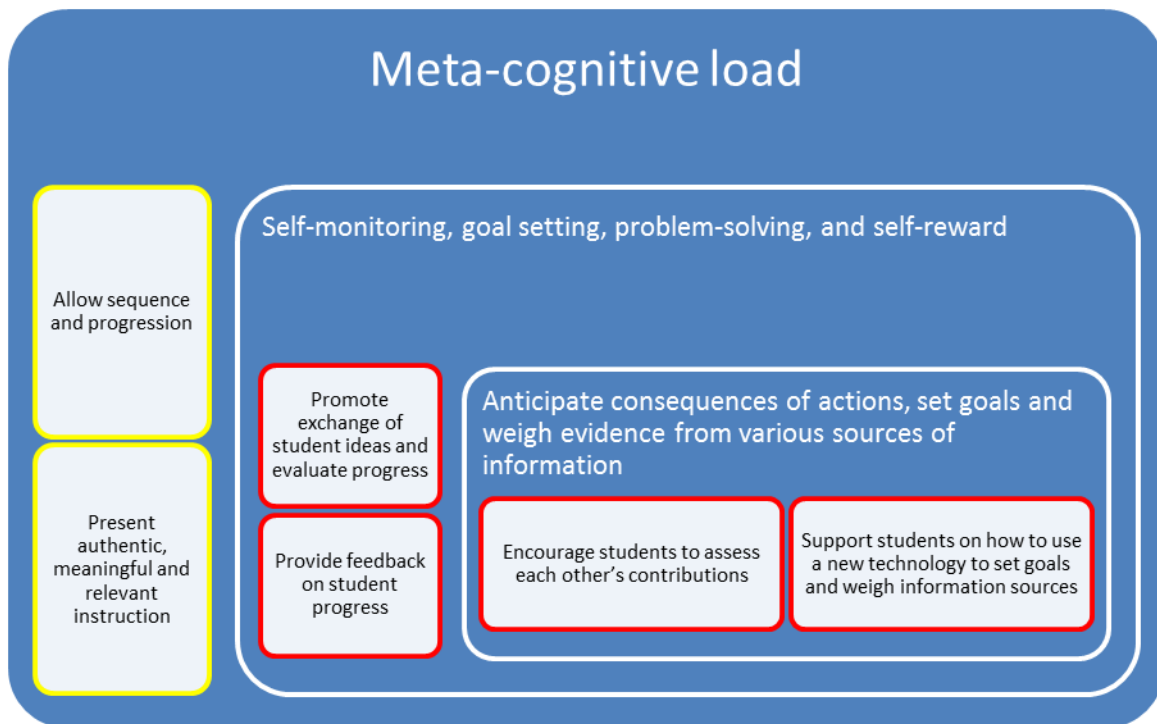


Figure 7.4: Summary of meta-cognitive load

7.6 Learning design element 5: Knowledge co-construction

7.6.1 Create new knowledge

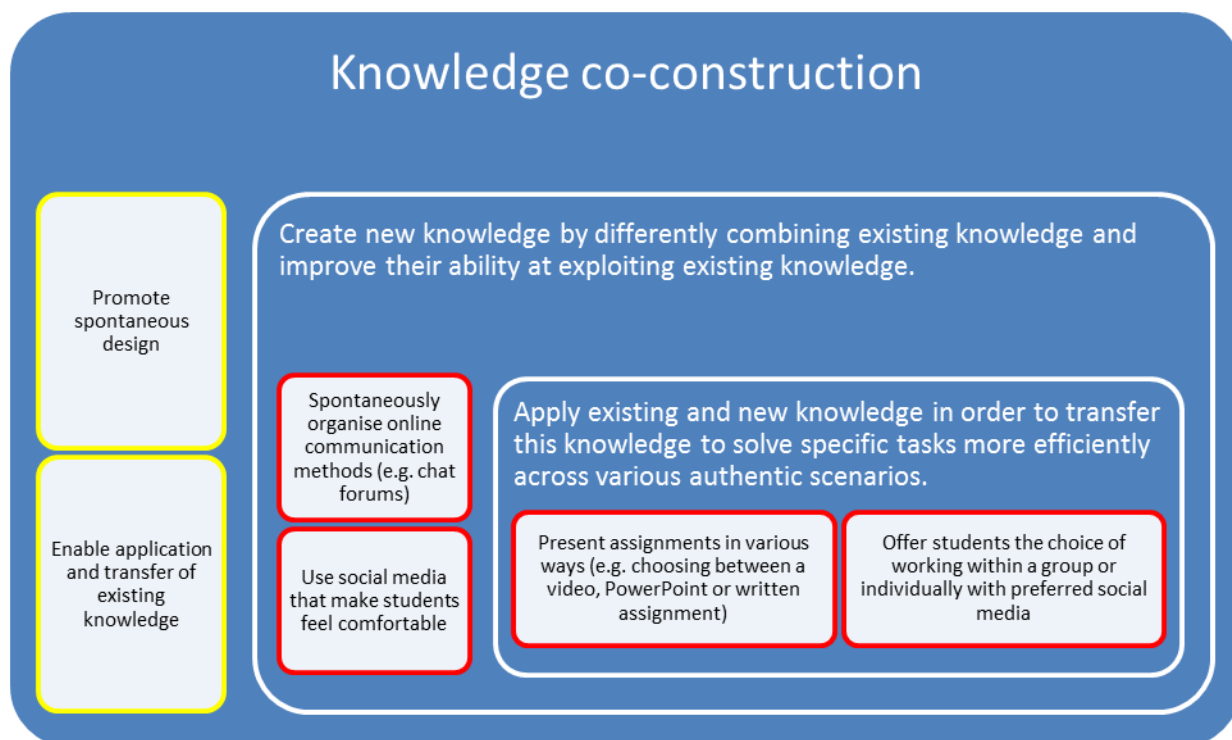
Knowledge construction is facilitated by good interactive online instruction, since the students need to take the initiative to learn and to interact with other students and the instructor, and because the learning agenda is controlled by the student (Murphy & Cifuentes, 2001). Findings from the study (Chapters 5 and 6) indicated that it is useful to allow students to spontaneously organise the communication methods they are comfortable with (such as contacting each other via online messenger programs), as opposed to prescribing the online tools used (such as requiring all online communication to be via the discussion board). This would mean that the academic may relinquish some control over the specific online interactions. One way to keep track of the interactions is to conduct peer evaluations of student contributions (Colwell & Jenks, 2004).

Learning activities could be designed in such a way that students can easily organise their own methods of online communication. The assignment outcomes could be specified and students could be provided with either various options or total freedom as to how they want to go about communicating with their peers. This would further enable students to make use of the social media that they feel comfortable with.

7.6.2 Apply existing and new knowledge

The online learning activities and experiences are designed in a way that promotes knowledge construction and transference across various authentic scenarios ranging in complexity. There is an inherent tension that remains between the learning design, the learning process and the use of the technology (Barton et al., 2009). Students may be offered a choice as to how they would like to present their assignments (such as choosing between video, PowerPoint or a written assignment). When offering such choice, it is important the grading rubric is very specific so that students understand the criteria that they will be graded against.

Findings from this study showed that the expectations for eLearning design are often in stark contrast with organisational policies and restrictions. The concern was raised that if a staff member wants to try a new activity or develop a new assessment item, there are often policy restrictions placed on them in the unit outline (Biggs & Tang, 2011). These restrictions can sometimes negatively impact on the implementation of novel ways of using the technology for knowledge construction. The learning design element 'knowledge construction' is shown by Figure 7.5.



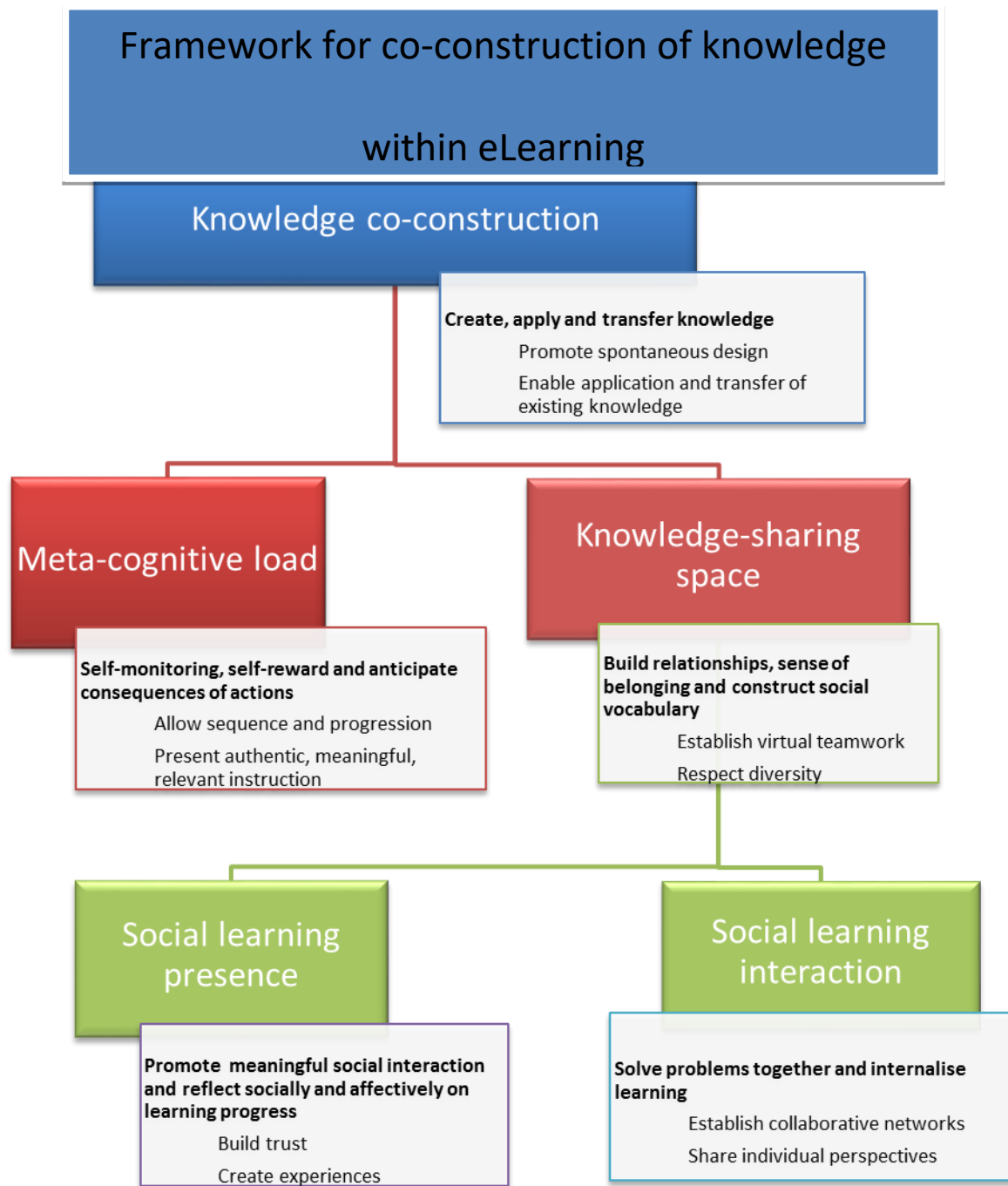


Figure 7.6: Framework co-construction of knowledge within eLearning

7.8 Summary

Chapter 7 presents the framework for social networking and co-construction of knowledge as derived from the analysis and findings of the study. The findings from the electronic survey provided practical information that underpins the requisite learning design elements for online learning environments that fully utilise social networking technology supported by co-construction of knowledge.

CHAPTER 8 CONCLUSIONS AND FUTURE WORK

8.1 Introduction

This chapter provides a summary of the research and highlights the main findings from the previous chapters. It reflects on the findings following the research aim and objectives as stated in Chapter 1. The preceding chapters examined the effectiveness of learning design elements and identified components informed by a constructivist instructional design (C-ID) approach. The study explored how learning design elements could be implemented within a framework applicable to the Australian eLearning higher education context. The researcher hypothesised that if eLearning practitioners, such as academics, instructional designers and learning designers, implement learning design elements that support social networking and the co-construction of knowledge, it may be possible to enhance learners' feelings of social connectedness, and as a result positively impact on online learning.

The general conclusion section presents a summary of the findings and implications of this study. The academic contributions and limitations of this study are also discussed in this chapter. The implications for future research section pose several suggestions on how this study may be extended to future work in this domain.

8.2 Summary of research study

The aim of this study was to examine the effective use of online learning elements that can contribute towards a framework to optimise learning within the Australian eLearning higher education context. The research objectives that were introduced in Chapter 1 are discussed to determine to what extent they were achieved.

8.2.1 Social networking and online collaboration

To meet the first research objective, namely to investigate the critical learning design elements for online collaborative learning that are informed by a constructivist instructional design approach, this study started by reviewing previous studies (as recorded in Chapter 2). The literature relating to instructional systems that are geared at creating electronic learning environments was scrutinised as it related to online collaborative learning within higher education settings. Review of the literature indicated that while social networking and online collaboration with other learners are essential to create knowledge, they are not always incorporated in a mindful way from the outset of the eLearning course or program.

The second research objective of the study, namely to validate the effectiveness of learning design elements for social networking and co-construction of knowledge against the perceptions of eLearning practitioners in the field of Australian higher education, was investigated during the second phase of the research study. Analysis and findings from the qualitative and quantitative data, as documented in Chapters 4, 5 and 6, indicated instructional strategies for each learning element to contribute towards the effective design of the eLearning environment. Following are highlights from the findings related to social networking and co-construction of knowledge.

8.3 Summary of research findings

8.3.1 Knowledge creation

Knowledge creation seldom exists in isolation and is usually part of a collaborative process that includes student, academic and the learning context. A dynamic knowledge creation process underpins constructivist design, but it is not always obvious how to best facilitate such an approach within eLearning spaces that also incorporate social media. Heavily pre-designed lectures may not always provide opportunities for students to explore real-life and current issues that are crucial to sense-making and the construction of knowledge.

Furthermore, the literature also showed that traditional instructional design models are cumbersome and costly. Accelerated approaches to eLearning design require frameworks that are cost-effective and require a minimum level of resource commitment.

8.3.2 Social network environments

Social learning interaction forms the basis for social networked environments, and the critical learning design elements associated with the constructivist concepts identified by this study are social learning presence, learning interaction, meta-cognitive load, knowledge-sharing space and knowledge creation. To establish what instructional designers, academics and course developers are currently implementing and what they would recommend, an eDelphi expert panel was brought together. The expert panel was followed up by more in-depth semi-structured interviews, and an electronic survey was distributed to further validate the findings. The main findings from the eDelphi expert panel and semi-structured interviews highlighted that web-based course design should allow opportunities for students to in the first instance be present online and then engage in the learning activities evidenced by social interaction.

As online social presence cannot be assumed or left to chance, the online learning activities should provide opportunities for students to demonstrate reflection on their learning progress, which can be done within social media applications such as online journals. A very diverse student cohort, especially if no efforts are made to find similarities, and the differences in time and time zones may affect social learning presence. Student cohorts sometimes do not want to interact online, especially with distance subjects, unless it is part of a summative assessment, and students like to keep their personal and academic lives separate.

Panel members rated individual student contribution as more critical than collaborative activities, although this could also be attributed to the general perception that individual efforts are easier to assess. Panel members agreed that online learning environments need to encourage interaction amongst students so that learning experiences are embedded throughout the design of the subject, and reflective tasks (e.g. blogs) and group tasks (e.g. wikis) could be used to cater for this development. Collaborative activities need to be designed in such a way that individual effort within the group can be easily assessed, and applications such as the wiki tool allow for this design. It is also complex to assess exactly how much new knowledge a student has gained during the learning process. This requires further research and investigation by future studies.

8.3.3 Perceived elements relating to social networking

The categories emerging from coding of the data sets for perceived aspects of the human-dimensions within eLearning were: learning activities and interactivities, social communication, collaboration, diversity, fears and the student-lecturer relationship. These categories need to be considered when designing for social learning interaction as they are aimed at addressing the human interaction with technology. The online environment can be a lonely and isolated place for both learners and academics. It may be challenging for students to feel pressured to put their thoughts into a public space, and fear of rejection or criticism may inhibit students from sharing openly. Relationships surrounding activities therefore need to be taken into account when designing the learning activities, and not merely the learning content and outcomes.

8.3.4 Instructional guidelines

The instructional guidelines considered most important when designing for online social interaction were: authentic, meaningful and relevant instruction; conscious modelling of behaviour; rules for engagement; user-centred design; and spontaneous design. All interviewees felt strongly that learning activities and assessments needed to be designed as authentic, meaningful and relevant to the learning that was taking place.

The main obstacles for implementing social media are the rapidly evolving nature of social media applications, suitable devices and student usage patterns. The average lecturer or academic may struggle to keep up-to-date and may consider learning new technologies as an obstacle due to time constraints. The general consensus amongst respondents was that

incorporating both synchronous and asynchronous forms of online communication adds value and a deeper relationship dimension to the eLearning program or course.

The question remains as to how much of the social media needs to be predesigned into a course, and how much should be left to students to personalise and construct their own social interaction environments by making use of technologies that they are most familiar with. Certain social media applications seem to support specific learning tasks more effectively, such as wikis for online collaboration and peer-assessment. A user-centred approach that allows for individuation may cater for student diversity; however, privacy and confidentiality may be at risk if students are allowed to choose any freeware application.

8.3.5 Design challenges

Design challenges for online social interaction included the organisational impact of including social media tools, alignment of technology and learning outcomes, and lack of feedback and evaluation of eLearning programs. Social networking tools that are selected for academic use need to include the provision to ensure privacy and confidentiality, and ensure that academic work is secure. Not only the users, but also the technical environments in which the learning resource will be used need to be considered in terms of designing curriculum and protecting participating students and staff.

The expectations for eLearning design were often in contrast with organisational policies and restrictions. Programs and modules did not always provide student feedback surveys on the learning experience, and did not always ask questions about the use of technology or the social interaction that took place during the course. This is a further organisational factor that is providing a design challenge for both policy makers and lecturers to advance innovation.

8.3.6 Build trust and create experiences

Learning design activities that support the promotion of meaningful social interaction and allow students to reflect socially and affectively on their learning progress are geared at establishing social learning presence. A lack of a sense of trust (technological or interpersonal) may adversely affect group dynamics. This may inhibit student motivation, which may result in lower attrition rates. Establishing a strong social learning presence fosters the building of trust and opportunities to create the social learning experiences that are critical for social networking. Trust is also established when the learning facilitator (academic, lecturer or tutor) is available, flexible with time and reachable, as this creates an environment where students feel less isolated.

8.3.7 Establish collaborative networks and share individual experiences

Allowing opportunities for students to solve problems, internalise learning and share individual perspectives on learning problems within an eLearning program encourages social learning interaction. When this learning design element is present, it is easier for students to establish collaborative networks and share individual perspectives.

Currently a wide range of social media applications are already employed to promote social networking, such as Adobe Connect, GoToMeeting, Blackboard Collaborate, Pinterest, Instagram and Google apps like Docs and Sites. Respondent recommendations included that academics could experiment with the latest technologies, and students may choose whether or not to continue using the technologies and the social network that was established once they have completed the course.

8.3.8 Establish virtual teamwork and respect diversity

Online learning design whereby students can build relationships, have a sense of belonging and construct social meaning and vocabulary endorses a space where knowledge can safely be shared. Respondents mentioned that the techniques that are currently being employed to promote student engagement are discussion board ice-breaker activities and the flipped classroom, namely getting students to comment on watching videos, readings and researching articles prior to formal lectures.

Case studies, field work and research activities are also viewed more favourably than examinations to promote knowledge-sharing space. Encouraging students find solutions to real-life problems within collaborative efforts also assists with the establishment of virtual teamwork and respect for diversity.

8.3.9 Present authentic, meaningful and relevant instruction

Online learning strategies that foster students to self-monitor, set goals, problem-solve and anticipate consequences of actions provide a challenging but not too strenuous set of circumstances for students. Despite the advancements in technology, it remains difficult and often frustrating to determine student engagement. One of the best ways to address this problem is to present authentic, meaningful and relevant instruction that can be evaluated by self- or peer assessment. The underlying assumption of the facilitator being the main person to provide feedback on student progress still prevails. Within higher education, more promotion could occur on the benefits of peer review and feedback.

8.3.10 Allow spontaneous design

Interactive online instruction that facilitates the creation of knowledge by differently combining existing knowledge across various scenarios may enable students to construct their own interpretative knowledge about the subject area. Findings from the study (Chapters 5 and 6) indicated that it is useful to allow students to spontaneously organise the communication methods they are comfortable with as opposed to prescribing the online tools. It seems that asynchronous interactions (e.g. discussion boards or email) are more enjoyable and logistically easier than synchronous events (e.g. live video and audio streaming). A suggested method to keep track of the interactions is to conduct peer evaluations of student contributions.

The most enjoyable elements of online learning were its flexibility, its time saving properties and the ability to connect with students. Inclusions of multimedia components such as video and voting functions were also mentioned. The least enjoyable elements of online learning were the difficulties in determining student engagement, workload and technical issues. Lack of organisational support and inadequate recognition for work were also mentioned by the respondents.

8.4 Contributions of the study

It is evidenced from the literature that social disconnectedness and feelings of isolation may adversely affect student motivation and learner satisfaction, especially within eLearning. The design of social learning interactions is often left to chance, and not always incorporated in a mindful and meaningful way from the outset of development of the eLearning course or module. Traditional instructional design prescribes the design process, but does not provide a framework for how the social interaction within the eLearning space needs to be optimised to support learning processes. The proposed eLearning framework includes the notion of participatory design as a collaborative team effort by all users.

The main contribution of this study is the framework that serves as a guideline for social networking and the co-construction of knowledge within eLearning environments. The framework identifies critical learning design elements for online collaborative learning that are informed by a constructivist instructional design approach.

Instructional designers and academic course developers require a framework to assist them to fully utilise new applications for social networking. This study demonstrates a mixed method approach by making use of both qualitative and quantitative data to explore concepts applied to a multi-modal learning environment.

This doctoral research contributes towards exploring new paradigms for social and computer-mediated interaction within eLearning by presenting a shared meaning, categories and recommended learning activities that can be utilised by instructional designers, academics and course developers when creating multi-layered complex online learning spaces.

8.5 Summary of limitations of the study

This study was contextualised within the Australian online higher education sector and may not be transferable to other educational contexts. This study made use of exploratory sequential research design, and the analysis and findings of the study were mainly exploratory and qualitative by nature.

The degree of expert eDelphi panel opinion change was relative to the degree of support received by the panellist. The survey instrument was evolving with the research process, and not a static instrument to which purist reliability standards could be applied.

8.6 Future work

The research design and methodology can be revised to include an experimental design where the learning design elements could be implemented within several online courses and measured with a student-satisfaction survey and student retention statistics. This could illustrate the impact of the learning design elements on online learning environments and further refinement of the proposed learning design elements. This study can be repeated with different educational contexts, such as further, secondary or primary education, to see if the results and findings would be transferable to other sectors. The survey instrument can be standardised and remain a more independent measure for future similar studies.

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APPENDICES

Appendix A: Plain language statement eDelphi expert panel

COLLEGE OF BUSINESS
SCHOOL OF BUSINESS INFORMATION TECHNOLOGY AND LOGISTICS
INVITATION TO PARTICIPATE IN A RESEARCH PROJECT
PROJECT INFORMATION STATEMENT
INVITATION FOR PARTICIPATION IN EDELPHI FOCUS-GROUP DISCUSSION

Project Title:

An exploration of the human-dimensions of Human-Computer Interaction within Web-based higher education

PhD researcher:

o Ms Mandi Axmann,
PhD candidate, School of Business IT & Logistics, RMIT University

Supervision team:

o **Elspeth McKay, PhD, FACS (Primary PhD Supervisor)**

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School of Business IT & Logistics, RMIT University,
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o **Dr Peter Macauley, (Second Supervisor)**

Senior Lecturer, Information and Knowledge Management
School of Business IT & Logistics RMIT University, Melbourne
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Tel +61 3 9925 5583

Dear Respondent

You are invited to participate in a research project being conducted by RMIT University, Melbourne Australia. This information sheet describes the project in straightforward language, or 'plain English'. Please read this sheet carefully and be confident that you understand its contents before deciding whether to participate. If you have any questions about the project, please ask one of the investigators.

This research is being conducted by Ms Mandi Axmann, a Business Information Systems PhD student, enrolled in the School of Business Information Technology. The research is supervised by Assoc Prof Elspeth McKay and Dr Peter Macauley of the RMIT University. The aim of this research is to investigate instructional principles that would support the human-dimensions of HCI in a web-based learning environment. This research project has been approved by the RMIT Human Research Ethics Sub-Committee.

You have been approached to participate in this research project because you have been identified as a subject-matter expert in this field. Approximately 10 selected respondents will be invited to participate in this pilot study.

You are requested to review the proposed EDelphi focus-group discussion website and provide feedback usability by completing the online survey. This website will form the basis of the EDelphi focus-group discussion.

You may choose to exit the study at any time during the study. Your responses will be securely stored for a period of five years in the School of Business Information Technology, RMIT University, and can only be accessed by the researchers. After five years, the data will be destroyed. Results published in academic journals and conferences will not include information that can potentially identify either you or your organisation.

There are no foreseeable risks associated with your participation in this research project. Your participation will assist the researchers and the wider information communications technology (ICT) and training community understanding how these instructional principles may enhance the human dimensions within human-computer interaction in a web-based environment.

Due to the nature of the data collection process, we are obtaining written consent from you. Please read this consent form carefully, and be confident that you understand its contents before signing the consent form. A copy of the signed consent form will be given to you for your records.

Your participation in this research is voluntary. As a respondent, you have the right to withdraw your participation at any time, have any unprocessed data withdrawn and destroyed, provided that it can be reliably identified and provided that so doing does not increase your risk; and have any questions answered at any time. Any information that you provide can be disclosed only if (1) it is to protect you or others from harm, (2) a court order is produced, or (3) you provide the researchers with written permission.

If you have any questions regarding this research, please contact the researcher, Assoc Prof Elspeth McKay, (03) 9925 5978, eMail: elspeth.mckay@rmit.edu.au or the other researchers listed above.

Thank you for your participation in this research.

Yours sincerely

Mandi Axmann, PhD student

School of Business IT & Logistics, RMIT University

**Any complaints about your participation in this project may be directed to the Secretary,
Portfolio Human Research Ethics Sub Committee, Business Portfolio, RMIT, GPO Box 2476V,
Melbourne, 3001.**

The telephone number is (03) 9925 5594 or email address rdu@rmit.edu.au.

Details of the complaints procedure are available from

http://www.rmit.edu.au/rd/hrec_complaints

Appendix B: Email invitation eDelphi focus-group

Dear <Title, Name, Surname>

You are invited to participate in a PhD research study underway at the **School of Business IT and Logistics, RMIT University, Melbourne Australia**. The outcomes of this work will further the exploration of new instructional paradigms for online social networking and computer-mediated interaction.

Brief overview of the Research Project

The **general aim of the research study** is to investigate which *instructional design principles* would guide the human-dimensions of human-computer interaction (HCI) within the Web-based higher education context.

Following is a brief description of the interpretation of the main areas of investigation for the purpose of this study.

Human-computer interaction (HCI) is the study of the interaction between human beings and their computer technologies. The general assumption we make of HCI is that it informs the design of more humanly acceptable computerised technology. Although HCI originated from the computer science and the information and communications technology (ICT) fields, it has substantially grown to include disciplines within the humanities arena. HCI is therefore multi-disciplinary in so far as representing both the machine-dimension and the human-dimensions.

Instructional design aims to facilitate and maximise the instructional learning process *within the Web-based environment*. It concerns itself with human beings' behaviour (or dimensions) within HCI and how these processes may support learning. This emerging field is also known as instructional technology.

Although instructional design principles for Web-based education have been the focus of many researchers, it is currently unclear which specific instructional principles would guide the human-dimensions of HCI within the Web-based learning context.

How this eDelphi Project Works

This eDelphi focus-group expert online panel survey provides feedback to the researcher for a **set of proposed instructional design review criteria** to facilitate the *human-dimensions* of HCI within an online learning environment.

The instructional design review criteria are detailed in the DISCUSSION DOCUMENT. Please find the discussion document attached to this email.

The discussion document is also available on the research project website.

URL: <http://www.eDelphi-study.org/>

There are three (3) rounds of feedback, and each survey builds on the collated, anonymous feedback from the respondents from the previous Delphi rounds.

What will I gain from participating in the research project?

Participation in this PhD research project is voluntary and you may withdraw at any time. If you decide to participate in this project, you will have the following benefits:

- an opportunity to discuss the latest developments in HCI and instructional science with subject-matter experts;
- the opportunity to experience the use of the eDelphi research method as a qualitative research technique; and
- an opportunity to voice your opinion and influence future standards in instructional science and HCI design principles.

Further details of the project is set out in the Plain Language statement (please find document attachment)

Please familiarise yourself with the Plain Language Statement and the Discussion Document attached to this email before completing the survey.

Research project website

If you have problems accessing this website, direct your browser to:

<http://www.eDelphi-study.org/>

<your login: ____ > <your password: < ____ >

*Every respondent receives a unique login and password. Once logged in, you can post questions on the online forum if you have any queries about the eDelphi process or the research study.

Click here to participate in the eDelphi Discussion Forum Round One

If you have problems accessing this survey, direct your browser to **https://www.surveymonkey.com/s/e_delphi_round_1**

Thank you for your kind consideration of this research project.

Regards

Mandi Axmann, PhD ScholarSchool of Business IT and Logistics, School of Business IT and Logistics, Building 108: 17, GPO Box 2476V, **RMIT University**, Melbourne Australia

Supervisor: Assoc Prof Elspeth McKay, PhD, FACS, School of Business IT and Logistics, School of Business IT and Logistics, Building 108: 17, GPO Box 2476V, RMIT University, Melbourne Australia –eMail: elspeth.mckay@rmit.edu.au

Any complaints about your participation in this project may be directed to the Chair, Business College Human Ethics Advisory Network, College of Business, RMIT, GPO Box 2476V, Melbourne, 3001.

The telephone number is (03) 9925 5598 or email address rdu@rmit.edu.au. Details of the complaints procedure are available from

<http://www.rmit.edu.au/browse;ID=2jqrn7hnpyo>

Appendix C: eDelphi expert panel discussion document

This questionnaire requires the respondent to rate five (5) learning design elements related to the human-dimensions of HCI within online learning.

- 1) These learning design elements are described in the DISCUSSION DOCUMENT attached to your email invitation and also available on the research project website. Please familiarise yourself with the Discussion Document before completing this questionnaire.
- 2) Please use as much space as you need for the open-ended questions.
- 3) There are no right or wrong answers. Please feel free to offer your own opinion based on your knowledge and experience of online higher education.
- 4) All information provided in this questionnaire will be treated as confidential.
- 5) This questionnaire will take between 5-10 minutes to complete.
- 6) For the purpose of the research study, you are kindly requested to please complete all the questions before submitting the questionnaire.

I consent to participate in the research project, the particulars of which, including details of the questionnaire have been explained to me.

- ☐ Yes
- ☐ No

I acknowledge that:

- a) Having read the Plain Language Statement, I agree to the general purpose, methods and demands of the study.
- b) I have been informed that I am free to withdraw from the project at any time and to withdraw any unprocessed data previously supplied.
- c) The project is for the purpose of research.
- d) The privacy of the information I provide will be safeguarded. However should information of a private nature need to be disclosed for moral, clinical or legal reasons, I will be given an opportunity to negotiate the terms of this disclosure.
- e) The security of the research data is assured during and after completion of the study.
- f) The data collected during the study may be published, and a report of the project outcomes will be provided to RMIT University. Any information which may be used to identify me will not be used unless I have given my permission.

- ☐ Yes
- ☐ No

Please provide your following demographic information. Be assured that all information will be treated as confidential.

Q1: Please indicate your state and country:

State/Province:

Country:

Q2: Please select your gender:

☐

Male

☐

Female

Q3. Please provide a brief description of your current employment position.

Please provide a brief description of your current employment position.

Q4: Please indicate your years of relevant experience with eLearning in higher education (this may include University, College or Further Education experience):

☐

2-6 years

☐

7-15 years

☐

16+ years

Please rate the review criteria for SOCIAL LEARNING PRESENCE as 1) Not useful, 2) Useful, 3) Essential or 4) Critical to the design of a web-based learning environment.

LEARNING DESIGN ELEMENT: SOCIAL LEARNING PRESENCE								
Description		Review Criteria		Rating				
The online learner interaction design supports the ability of learners to project themselves socially and affectively into a learning community.		Q5: The online learning activities promote meaningful instructor-student and student-student interaction that allow students to engage in a learning community.	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td></tr></table>		1	2	3	4
		1	2	3	4			
		Q6: The web-based course design allows opportunities for students to interact socially with each other in the online environment.	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td></tr></table>		1	2	3	4
1	2	3	4					
Q7: The online learning activities provide opportunities for students to reflect socially and affectively on their learning progress.	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td></tr></table>		1	2	3	4		
1	2	3	4					
Q8.Any further comments on this review criteria SOCIAL LEARNING PRESENCE:								

Please rate the review criteria for SOCIO-CONSTRUCTIVIST INTERACTION as 1) Not useful, 2) Useful, 3) Essential or 4) Critical to the design of a web-based learning environment.

LEARNING DESIGN ELEMENT: SOCIO-CONSTRUCTIVIST INTERACTION								
Description		Review Criteria		Rating				
The online learning interaction supports socio-constructivist interaction and contributes to the creation of a social learning system.		Q8: Students are provided with online opportunities for mutual engagement in a coordinated effort to solve problems together (online collaboration).		<table><tr><td>1</td><td>2</td><td>3</td><td>4</td></tr></table>	1	2	3	4
1	2	3	4					

	Q9: Students are able to share their individual perspectives on learning problems within the online group discussion.	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4
1	2	3	4			
Q12. Any further comments on this review criteria SOCIO-COGNITIVE INTERACTION:						
<p>Please rate the review criteria for KNOWLEDGE SHARING SPACE, as 1) Not useful, 2) Useful, 3) Essential or 4) Critical to the design of a web-based learning environment.</p>						
LEARNING DESIGN ELEMENT: KNOWLEDGE SHARING SPACE						
Description	Review Criteria	Rating				
The online learning environment is designed to maximise sharing and distribution of knowledge in a safe space.	Q10: The web-based course design allows for students to contribute their own knowledge, learning and experience to the online environment.	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4
	1	2	3	4		
	Q11: The online learning activities create opportunities for students to interact, learn together, build relationships, and develop a sense of belonging and mutual commitment.	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4
1	2	3	4			
Q12: The online learning events provide students with opportunities to construct social meanings and vocabulary by means of cross-cultural sharing.	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4	
1	2	3	4			
Q17. Any further comments on this review criteria KNOWLEDGE SHARING SPACE:						
<p>Please rate the review criteria for META-COGNITIVE LOAD, as 1) Not useful, 2) Useful, 3) Essential or 4) Critical to the design of a web-based learning environment.</p>						
LEARNING DESIGN ELEMENT: META-COGNITIVE LOAD						
Description	Review Criteria	Rating				
The sequence and progression of the online learning experience supports meta-thinking and meta-cognitive load.	Q13: Students are provided with online opportunities for self-monitoring, goal setting, problem-solving, and self-reward.	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4
	1	2	3	4		
Q14: The storing and processing of complex information in cognitive operations allow students to anticipate consequences of actions, set goals and weigh evidence from various sources of information.	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4	
1	2	3	4			
Q20: Any further comments on this review criteria META-COGNITIVE LOAD:						
<p>Please rate the review criteria for KNOWLEDGE CONSTRUCTION AND TRANSFERENCE, as 1) Not useful, 2) Useful, 3) Essential or 4) Critical to the design of a web-based learning environment.</p>						
LEARNING DESIGN ELEMENT: KNOWLEDGE CONSTRUCTION AND TRANSFERENCE						
Description	Review Criteria	Rating				
The online learning activities and experiences are designed in a way that promotes knowledge construction and transference across various authentic scenarios ranging in complexity.	Q15: The online learning events allow students opportunities to create new knowledge by differently combining existing knowledge and improve their ability at exploiting existing knowledge.	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table>	1	2	3	4
	1	2	3	4		
Q16: The online learning design enables students to identify existing and accessible knowledge, in order to transfer and apply						

	this knowledge to solve specific tasks more efficiently and effectively.	1	2	3	4
	Q17: The online learning activities present students with different authentic scenarios and situations to apply and evaluate their acquired learning	1	2	3	4
Q18: Any further comments on this review criteria : KNOWLEDGE CONSTRUCTION AND TRANSFERENCE					

Appendix D: Email invitation semi-structured interviews

Dear

I would like to invite you to participate in a research study conducted by the School of Business Information Technology, RMIT university.

This research study aims to explore **instructional guidelines** that will effectively support the human-dimensions within an educational online environment. The interview includes questions about your view of human dimensions within online learning. You will also be asked to identify the primary challenges for designing for interaction and social media today (please find the specific questions below. These questions are available also as a Word document attachment to this email).

Please be aware that the interview will be **audio-taped with your consent** (please find consent form attached). You are required to please read the Plain Language statement attached to this email, and then sign the consent form prior to the interview.

The interviews are treated as **confidential**, and any identifying information such as real names and work affiliations will not be disclosed when the findings are reported.

The interviews may be conducted face-to-face, via Skype or telephonically depending on the geographic location and availability of the respondent.

Following are the draft questions for the semi-structured interviews:

1. Please briefly describe your current role and experience with online learning.
2. *In your own words*, how would you define/describe the human dimensions within online learning?
3. Do you currently employ any social media (blog, twitter, online discussion forums, wiki's etc.) within the courses you are designing and/or delivering? (If yes, please continue to questions 4 and 5, if no, please skip to questions 6 and 7).
4. **If YES**, please state which social media, and rate how effective you believe this to be to support the human dimensions of online learning? (This is your opinion only and does not have to be supported by literature or current views.)
5. Please briefly describe one success story that you had within your course design when you employed a form of social media? If you had no success, what would you ascribe that to?
6. **If NO**, what are your reasons for not employing social media within the courses you are designing and/or delivering?
7. Would you consider employing social media in the future? Please motivate your answer.
8. If you had to provide the most important instructional guidelines for supporting the human dimensions (*according to your own definition/description from question 2*) to your online learning environment, what would that be or look like?
9. What do you think are the primary challenges of designing for interaction today?
10. What do you think are the primary challenges for implementing social media today?
11. Any further conclusions and/or comments that you would like to add.

If you consent to participate in this study, please reply to this email so that we can organise a suitable place and time for the interview. Your feedback is regarded as very valuable and is viewed as an important contribution to this study.

I thank you in advance for your time and consideration of this research project.

Kind regards

Mandi Axmann

PhD candidate Management School of Business Information Technology RMIT University,
Melbourne GPO Box 2476V, Melbourne, Victoria, 3001, Australia

Appendix E: Plain language statement



College of Business

School of Business Information Technology

INVITATION TO PARTICIPATE IN A RESEARCH PROJECT PROJECT INFORMATION STATEMENT

INVITATION FOR PARTICIPATION IN SEMI-STRUCTURED INDIVIDUAL INTERVIEW

Project Title:

An exploration of the human-dimensions of Human-Computer Interaction within Web-based education

PhD researcher:

- Ms Mandi Axmann (PhD candidate, School of Business IT, RMIT University)

Supervision team:

- Elspeth McKay, PhD, FACS (Primary PhD Supervisor), Senior Lecturer, School of Business IT, RMIT University, elspeth.mckay@rmit.edu.au, Tel +61 3 9925 5978
- Dr Peter Macauley, (Second Supervisor) Senior Lecturer, Information and Knowledge Management School of Business Information Technology RMIT University, Melbourne GPO Box 2476V, Melbourne, Victoria, 3001, Australia peter.macauley@rmit.edu.au Tel +61 3 9925 5583

Dear Respondent

You are invited to participate in a research project being conducted by RMIT University, Melbourne Australia. Please read this sheet carefully and be confident that you understand its contents before deciding whether to participate. If you have any questions about the project, please ask one of the investigators.

This research is being conducted by Ms Mandi Axmann, a Business Information Systems PhD student, enrolled in the School of Business Information Technology. The research is supervised by Dr Elspeth McKay and Dr Peter Macauley of the RMIT University. The aim of this research is to investigate instructional principles that would support the human-dimensions of HCI in a web-based learning environment. This research project has been approved by the RMIT Human Research Ethics Sub-Committee.

You have been approached to participate in this research project because you have been identified as a subject-matter expert in this field. Approximately 15 respondents were purposefully selected to be invited to this interview. .

The interviews are treated as confidential, and any identifying information such as real names and work affiliations will not be disclosed when the findings are reported. The interviews will be conducted face-to-face, via Skype or telephonically depending on the geographic location and availability of the respondent.

This research study aims to explore instructional guidelines that will effectively support the human-dimensions within an online environment for tertiary education. You will be asked questions about your current role and experience with online learning. Questions about how you currently employ social media will be asked. You will also be asked to identify the primary challenges for designing for interaction and social media today (please find detailed list of questions attached).

Please be aware that the interview will be audio-taped with your consent (please find consent form attached).

You may choose to exit the interview at any time during the study. Your responses will be securely stored for a period of five years in the School of Business Information Technology, RMIT University, and can only be accessed by the researchers. After five years, the data will be destroyed. Results published in academic journals and conferences will not include information that can potentially identify either you or your organisation.

There are no foreseeable risks associated with your participation in this research project. Your participation will assist the researchers and the wider information communications technology (ICT) and training community understanding how these instructional principles may enhance the human dimensions within human-computer interaction in a web-based environment.

Due to the nature of the data collection process, we are obtaining written consent from you. Please read this consent form carefully, and be confident that you understand its contents before signing the consent form. A copy of the signed consent form will be given to you for your records.

If you have any questions regarding this research, please contact the researcher, Dr Elspeth McKay, (03) 9925 5978, eMail: elspeth.mckay@rmit.edu.au or the other researchers listed above.

Thank you for your participation in this research.

Yours sincerely

Mandi Axmann, PhD student

School of Business IT, RMIT University

Any complaints about your participation in this project may be directed to the Secretary, Portfolio Human Research Ethics Sub Committee, Business Portfolio, RMIT, GPO Box 2476V, Melbourne, 3001. The telephone number is (03) 9925 5594 or email address rdu@rmit.edu.au. Details of the complaints procedure are available from http://www.rmit.edu.au/rd/hrec_complaints

Appendix F: Consent form semi-structured interviews

RMIT HUMAN RESEARCH ETHICS COMMITTEE

Prescribed Consent Form for Persons Participating In Research Projects Involving Interviews, Questionnaires, Focus Groups or Disclosure of Personal Information

Business

COLLEGE OF
SCHOOL/CENTRE OF

Business Information Technology

Name of Respondent:

Project Title:

An exploration of the human-dimensions of Human-Computer Interaction within Web-based higher education

Name(s) of Investigators:

Mandi Axmann

Phone: (03) 8628 2523

Elsbeth McKay PhD FACS

(03) 9925 5978

Peter Macauley PhD

(03) 9925 5583

1. I have received a statement explaining the interview/questionnaire involved in this project.
2. I consent to participate in the above project, the particulars of which - including details of the interviews or questionnaires - have been explained to me.
3. I authorise the investigator or his or her assistant to interview me or administer a questionnaire.
4. I give my permission to be audio taped: ☐ Yes ☐ No
5. I give my permission for my demographic details (gender, location) to be used: ☐ Yes ☐ No
6. I acknowledge that:
 - (a) The interviews are treated as confidential, and any identifying information such as real names and work affiliations will not be disclosed when the findings are reported.
 - (b) Having read the Plain Language Statement, I agree to the general purpose, methods and demands of the study.
 - (c) I have been informed that I am free to withdraw from the project at any time and to withdraw any unprocessed data previously supplied.
 - (d) The project is for the purpose of research and/or teaching. It may not be of direct benefit to me.
 - (e) The privacy of the information I provide will be safeguarded. However should information of a private nature need to be disclosed for moral, clinical or legal reasons, I will be given an opportunity to negotiate the terms of this disclosure.
 - (f) The security of the research data is assured during and after completion of the study. The data collected during the study may be published. Any information which may be used to identify me will not be used unless I have given my permission.

Respondent's Consent

Name: _____ Date: _____
(Respondent)

Name: _____ Date: _____
(Witness to signature)

Any complaints about your participation in this project may be directed to the Chair, Portfolio Human Research Ethics Sub-Committee, Business Portfolio, GPO Box 2476V, Melbourne, 3001. The telephone number is (03) 9925 5594 or email address rdu@rmit.edu.au. Details of the complaints procedure are available from: http://www.rmit.edu.au/rd/hrec_complaints

Appendix G: Interview protocol semi-structured questions

1. Please briefly describe your current role and experience with online learning?
 2. In your own words, how would you define/describe the human dimensions within online learning?
 3. Do you currently employ any social media (blog, twitter, online discussion forums, wiki's etc.) within the courses you are designing and/or delivering? (If yes, please continue to questions 4 and 5, if no, please skip to questions 5 and 6).
 4. If YES, please state which social media, and rate how effective you believe this to be to support the human dimensions of online learning? (This is your opinion only and does not have to be supported by literature or current views.)
 5. Please briefly describe one success story that you had within your course design when you employed a form of social media? If you had no success, what would you ascribe that to?
 6. If NO, what are your reasons for not employing social media within the courses you are designing and/or delivering?
 7. Would you consider employing social media in the future? Please motivate your answer.
 8. If you had to provide the most important instructional guidelines for supporting the human dimensions (according to your own definition/description from question 2) to your online learning environment, what would that be or look like?
 9. What do you think are the primary challenges of designing for interaction today?
 10. In your experience, what do consider the main obstacles for implementing social media today?
 11. Any further conclusions or comments that you would like to add.
-

Appendix H: Online survey instrument

Questions

Please rate the importance of the following tasks when you teach as a facilitator (e.g. tutor, lecturer, instructor) in an online classroom.

	Important	Unimportant	Neither Important Not at all	Very Important	Very Extremely Important
Provide biographical data of yourself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitate the discussion forum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create a Facebook page for students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Allow students to determine their own rules for online interaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitate online learning tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Set up rules for online interaction (netiquette)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide constructive feedback on assignments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please state if there are any other activities that you consider of a high importance when you teach as a facilitator in an online classroom?

Which of the following learning tasks do you employ on a regular basis in your *online classroom* (e.g. Blackboard or Moodle learning management system) ?

	Never	Rarely	Sometimes	Most of the time	Always
Individual written assignment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Group work project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Virtual laboratory activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Field work experiment (students report on activities conducted in their real lives)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online quiz	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online final examination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Blogging activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wiki activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Webinars such as Blackboard Collaborate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Small group online tutorials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online portfolio activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please state if there are any other learning tasks that you employ on a regular basis in your *online classroom*?

If you had to give advice to a novice (new) online tutor on how to promote student engagement in an *online classroom*, what would you rate as effective advice?

	Very Ineffective	Ineffective	Neither Effective nor Ineffective	Effective	Very Effective
Build lecturer-to-student relationship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encourage student-to-student relationships	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Establish learner support such as 'how to' files and frequently asked questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create a thread on the discussion forum for informal social interaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Include small-group activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide a blog where students can share reflections on their learning experiences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Create a wiki page where students can work together on a project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conduct a webinar (virtual classroom) for realtime student discussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Structure a series of online quizzes based on a case study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Include video presentations of lectured materials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please include any other advice that you would like to give to a novice tutor on how to promote student engagement in an *online classroom*.

Please rate the effectiveness of the following activities to encourage students to find solutions to real life problems in an *online classroom*?

	Very Ineffective	Very Ineffective	Neither Effective	Effective	Effective
Case studies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Field work experiments (students report on activities conducted in their real lives)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Virtual laboratory task	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Virtual simulations (online scenarios)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online games	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quizzes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Virtual tours	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Written assignments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Examinations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**The students are required to work collaboratively in the *online classroom* to produce a group work assignment.
What would you rate as an important facilitation task?**

	Important	Unimportant	Neither Important Not at all	Very Important	Very Extremely Important
Allocate marks to individual students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promote exchange of student ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide feedback on student progress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encourage students to assess each other's contribution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support students on how to use a new technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Which of the following actions would you prefer in your *online classroom*?

	Strongly Avoid	Avoid	Indifferent	Prefer	Strongly Prefer
Students spontaneously organise their online communication methods (e.g chat forums)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students present assignments in various ways (e.g. choosing between a video, PowerPoint or written presentation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students have a choice if they want to work in groups or individually	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students make use of the social media that they are comfortable with (e.g. Twitter or Facebook).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Include a face-to-face teaching component (e.g. workshop or lab work)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What would you consider important organisational support for developing a successful *online classroom*?

	Important	Unimportant	Neither Important Not at all	Very Important	Very Unimportant	Extremely Important
Academic professional development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work load model for online delivery (appropriate time and budget allocation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organisational policy (support technical requirements)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sufficient technical support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective program evaluation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Would you like to include any other important support that is not included on the list?

How would you rate your enjoyment level for *teaching online*? Slide the scale up for positive and down for negative.



Please indicate what describes your feelings the most?

	Clearly does not describe my feelings	Mostly does not describe my feelings	Somewhat describes my feelings	Mostly describes my feelings	Clearly describes my feelings
I look forward to writing on the discussion forum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy online interaction with the students (discussion, email)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer live chat rooms and virtual classrooms (such as Blackboard Collaborate)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer teaching face-to-face in a regular classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What do you enjoy the MOST about *teaching online*?

What do you enjoy the LEAST about *teaching online*?

On a scale from 0-10, how likely are you to recommend *online learning* to a student or colleague?

Not at all likely										Extremely likely
0	1	2	3	4	5	6	7	8	9	10
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Demographics

1. What is your gender?

Female	Male	Other
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is the highest level of education you have completed?

- ☐ University Undergraduate Degree
- ☐ Honours Degree
- ☐ Masters Degree
- ☐ Professional Degree (JD, MD)
- ☐ Doctoral Degree
- ☐ Other

Please indicate your years of experience in online higher education (this may include University, College or Further education)

1-2	3-5	6-9	10+
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your State or Territory in Australia

Australian Capital Territory	New South Wales	Northern Territory	Queensland	South Australia	Tasmania	Victoria	Western Australia	Not residing within Australia
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Provide a brief description of your current employment position (your job title will suffice)

Appendix I: Survey questions related to the learning design elements

SOCIAL LEARNING PRESENCE		
Description	Criteria	Related survey questions
<p>Definition</p> <p>The term ‘social learning presence’ refers to the robustness of the learning design to support learners to project themselves socially and affectively into a learning community.</p>	<p>The online learning activities promote meaningful instructor-student and student-student interactions that allow students to engage in a learning community.</p>	<p>Question 1: Please rate the importance of the following tasks when you teach as a facilitator (e.g. tutor, lecturer, instructor) in the online classroom.</p> <ul style="list-style-type: none"> • Provide biographical data of yourself • Facilitate the discussion forum • Create a Facebook page for students • Allow students to determine their own rules for interaction • Facilitate online learning tasks • Set up rules for online interaction (netiquette) • Provide constructive feedback on assignments <p>Question 2 (Open-ended): Please state if there are other activities that you consider of a high importance when you teach as a facilitator in the online classroom.</p> <p>Question 3: Which of the following learning tasks do you employ on a regular basis in your online classroom?</p> <p>Question 4 (Open-ended): Please state if there are any other tasks that you employ on a regular basis in your online classroom?</p>
<p>Rationale</p> <p>When designing a web-based learning environment, it becomes crucial to create a space where learners can acquire meaningful deep learning experiences as a result of ongoing social interactions and collaborative networks.</p>	<p>The learning design allows opportunities for students to interact socially with each other in the online environment.</p>	
	<p>The online learning activities provide opportunities for students to reflect socially and affectively on their learning progress.</p>	

SOCIAL LEARNING INTERACTION

Description	Criteria	Related survey questions
<p>Definition</p> <p>The 'social learning interaction' refers to how the design of the online learning interaction supports and contributes to the creation of a social learning system.</p> <p>Rationale</p> <p>Students are encouraged to assume responsibility towards their own learning, effective collaboration and meaningful engagement, as well as constructive solutions to real-life problems.</p>	<p>Students are provided with online opportunities for mutual engagement in a coordinated effort to solve problems together (online collaboration)</p> <hr/> <p>Students are able to share their individual perspectives on learning problems within the online group discussions.</p>	<p>Question 5: If you had to give advice to a novice (new) online tutor on how to promote student engagement in an online classroom, what would you rate as effective advice?</p> <ul style="list-style-type: none"> • Build lecturer-to student relationship • Encourage student-to-student relationships • Establish learner support such as 'how to' files and frequently asked questions • Include small-group activities • Provide a blog where students can share reflections on their learning experiences • Create a wiki page where students can work together on a project • Conduct a webinar (virtual classroom) for real-time student discussion • Structure a series of online quizzes based on a case study • Include video presentations of lectured material. <p>Question 6: (Open-ended) Please include any other advice that you would like to give to a novice tutor on how to promote student engagement in the online classroom.</p>

KNOWLEDGE-SHARING SPACE

Description	Criteria	Related survey questions
<p>Definition</p> <p>‘Knowledge-sharing space’ is defined as how the learning design is maximised to allow for sharing and distribution of knowledge in a safe space.</p>	<p>The web-based course design allows for students to contribute their own knowledge, learning and experience to the online environment.</p>	<p>Question 7: Please rate the effectiveness of the following activities to encourage students to find solutions to real life problems in the online classroom?</p> <ul style="list-style-type: none"> • Case studies • Field work experiments (students report on activities conducted in real life) • Virtual laboratory task • Research activities • Virtual simulations (online scenarios) • Online games • Quizzes
<p>Rationale</p> <p>Constructivism maintains that educators craft learning experiences into an active, experiential process in which learners create new ideas and think through problems.</p>	<p>The online learning activities create opportunities for students to interact, learn together, build relationships, and develop a sense of belonging and mutual commitment.</p>	
	<p>The online learning events provide students with opportunities to construct social meanings and vocabulary by means of cross-cultural sharing.</p>	

META-COGNITIVE LOAD

Description	Criteria	Related survey questions
<p>Definition</p> <p>'Meta-cognitive load' refers to the sequence and progression of the online learning experience in support of meta-thinking.</p> <p>Rationale</p> <p>Meta-cognition is a learner's ability to be aware of their cognitive capabilities and use these capabilities to learn. When learning online, learners should be given the opportunity to reflect on what they are learning, collaborate with other learners, and check their progress.</p>	<p>Students are provided with online opportunities for self-monitoring, goal setting, problem-solving, and self-reward.</p> <hr/> <p>The storing and processing of complex information in cognitive operations allow students to anticipate consequences of actions, set goals and weigh evidence from various sources of information.</p>	<p>Question 8: The students are required to work collaboratively in the online classroom to produce a group work assignment.</p> <p>Which of the following would you rate as an important facilitation task?</p> <ul style="list-style-type: none"> • Allocate marks to individual students • Promote exchange of student ideas • Provide feedback on student progress • Encourage students to assess each other's contribution • Support students on how to use a new technology

KNOWLEDGE CONSTRUCTION AND TRANSFERENCE

Description	Criteria	Related survey questions
<p>Definition</p> <p>‘Knowledge construction and transference’ is the creation of knowledge, information exchange, and knowledge transfer that takes place within a context of interaction between human beings.</p> <p>When purposefully designing for interaction, the educational environment needs to be structured in such a way as to optimally support knowledge and information exchange.</p>	<p>The online learning events allow students opportunities to create new knowledge by differently combining existing knowledge and improve their ability at exploiting existing knowledge.</p> <hr/> <p>The online learning design enables students to identify existing and accessible knowledge, in order to transfer and apply this knowledge to solve specific tasks more efficiently and effectively.</p> <hr/> <p>The online learning activities present students with different authentic scenarios and situations to apply and evaluate their acquired learning.</p>	<p>Question 9: Which of the following actions would you prefer in your online classroom?</p> <ul style="list-style-type: none"> • Students spontaneously organize their online communication methods (eg chat forums) • Students present assignments in various ways (eg choosing between a video, PowerPoint or written presentation) • Students have a choice if they want to work within a group or individually • Students make use of the social media that they are comfortable with • Include a face-to-face teaching component (eg workshop or lab work)
<p>Rationale</p> <p>The online learning activities and experiences are designed in a way that promotes knowledge construction and transference across various authentic scenarios ranging in complexity.</p>		

Appendix J: Data tables for Chapter 6

Table 6.1: Items regarding importance of online facilitation tasks, levels of education

Item	Bachelor's (N = 25)	Master's (N = 35)	Professional/Doctoral (N = 33)	Other (N = 20)	p-value
1	3.12 (1.13)	3.54 (1.07)	3.55 (0.79)	3.75 (0.55)	0.259
2	4.20 (0.58)	4.34 (0.84)	4.21 (0.55)	4.30 (0.47)	0.401
3	2.56 (0.92)	2.51 (1.12)	2.06 (1.12)	2.50 (1.15)	0.187
4	2.92 (0.95)	3.00 (1.06)	2.97 (0.95)	3.30 (1.03)	0.519
5	4.28 (0.61)	4.57 (0.61)	4.33 (0.48)	4.15 (0.59)	0.035*
6	4.08 (0.86)	4.60 (0.60)	4.45 (0.56)	4.40 (0.60)	0.065
7	4.60 (0.71)	4.83 (0.38)	4.82 (0.39)	4.75 (0.44)	0.601

Note: * indicates significance at the 0.05 level.

Table 6.2: Items regarding learning tasks employed, levels of education

Item	Bachelor's (N = 25)	Master's (N = 35)	Professional/Doctoral (N = 33)	Other (N = 20)	p-value
1	2.68 (1.22)	2.89 (1.26)	2.30 (1.40)	2.60 (1.35)	0.312
2	2.60 (1.19)	3.06 (1.06)	3.52 (1.25)	2.60 (1.27)	0.017*
3	3.80 (0.91)	3.91 (0.98)	4.48 (0.87)	3.75 (1.07)	0.005*
4	1.92 (1.00)	2.26 (1.29)	1.76 (1.15)	2.20 (1.28)	0.287
5	2.44 (1.39)	2.66 (1.39)	2.42 (1.52)	3.45 (1.47)	0.073
6	3.76 (1.20)	3.66 (1.16)	3.24 (1.44)	3.50 (1.32)	0.554
7	2.60 (1.44)	2.14 (1.35)	1.76 (1.06)	1.65 (0.99)	0.061
8	2.20 (1.04)	2.57 (1.15)	2.21 (1.34)	2.50 (1.50)	0.537
9	1.92 (1.00)	2.40 (1.09)	2.00 (1.20)	1.90 (0.85)	0.194
10	2.36 (1.29)	3.03 (1.45)	2.39 (1.41)	2.90 (1.55)	0.189
11	2.52 (1.09)	2.60 (1.33)	2.06 (1.17)	2.75 (1.48)	0.192

Note: * indicates significance at the 0.05 level.

Table 6.3: Items regarding effective advice of online facilitation to promote student engagement in an online classroom, levels of education

Item	Bachelor's (N = 25)	Master's (N = 35)	Professional/Doctoral (N = 33)	Other (N = 20)	p-value
1	4.12 (0.88)	4.66 (0.48)	4.33 (0.60)	4.55 (0.51)	0.018*
2	4.20 (0.76)	4.63 (0.55)	4.33 (0.48)	4.40 (0.60)	0.043*
3	4.28 (0.68)	4.43 (0.70)	4.09 (0.95)	4.20 (0.70)	0.410
4	3.68 (0.85)	4.20 (0.83)	3.45 (1.03)	3.95 (0.95)	0.014*
5	3.48 (0.82)	4.23 (0.73)	3.61 (0.70)	3.60 (0.75)	0.000*
6	3.52 (1.09)	3.66 (0.91)	3.42 (0.94)	3.45 (0.76)	0.704
7	3.00 (1.04)	3.57 (0.82)	3.36 (1.06)	3.20 (0.89)	0.134
8	3.44 (1.00)	4.09 (1.01)	3.48 (1.00)	3.95 (1.00)	0.015*
9	4.00 (0.91)	3.91 (0.98)	3.70 (0.85)	3.85 (1.09)	0.385
10	4.28 (0.79)	4.23 (0.94)	3.88 (0.89)	4.60 (0.50)	0.020*

Note: * indicates significance at the 0.05 level.

Table 6.4: Items regarding effective activities of online facilitation to encourage students to find solutions to real-life problems in an online classroom, levels of education

Item	Bachelor's (N = 25)	Master's (N = 35)	Professional/Doctoral (N = 33)	Other (N = 20)	p-value
1	4.24 (0.66)	4.09 (0.78)	4.21 (0.78)	4.15 (0.81)	0.881
2	3.80 (1.16)	4.23 (0.97)	3.91 (0.84)	4.30 (0.80)	0.137
3	3.24 (1.01)	3.57 (0.88)	3.12 (0.99)	3.65 (1.04)	0.093
4	3.84 (0.75)	4.20 (0.83)	4.15 (0.71)	4.15 (0.59)	0.168
5	3.64 (0.86)	3.94 (0.84)	3.64 (0.86)	3.90 (0.79)	0.376
6	3.28 (0.98)	3.89 (0.96)	2.94 (1.09)	3.55 (0.76)	0.001*
7	4.00 (0.91)	3.77 (1.03)	3.70 (0.85)	3.90 (0.85)	0.508
8	3.28 (0.98)	3.74 (0.85)	3.42 (1.00)	3.75 (0.91)	0.221
9	3.80 (1.04)	4.09 (0.82)	4.00 (0.83)	3.90 (0.79)	0.642

10	3.48 (1.09)	3.14 (1.12)	3.33 (1.22)	3.00 (1.12)	0.381
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*Note: * indicates significance at the 0.05 level.*

Table 6.5: Items regarding preferable actions in the online classroom, levels of education

Item	Bachelor's (N = 25)	Master's (N = 35)	Professional/Doctoral (N = 33)	Other (N = 20)	p-value
1	3.04 (0.74)	3.54 (1.15)	3.52 (1.00)	3.55 (1.19)	0.065
2	4.00 (0.82)	4.03 (1.15)	3.48 (1.03)	3.60 (1.00)	0.036*
3	2.88 (0.97)	3.34 (1.16)	3.30 (1.26)	3.05 (1.10)	0.449
4	3.12 (0.53)	3.40 (0.98)	3.12 (0.99)	3.15 (1.23)	0.567
5	4.08 (0.70)	3.51 (1.07)	3.82 (0.92)	4.30 (0.80)	0.024*

*Note: * indicates significance at the 0.05 level.*

Table 6.6: Items regarding preferable actions in online classroom, years of experience

Item	1-2 (N = 32)	3-5 (N = 36)	6-9 (N = 22)	10+ (N = 21)	p-value
1	3.34 (0.94)	3.47 (0.97)	3.27 (1.12)	3.67 (1.28)	0.318
2	3.97 (0.90)	3.64 (1.05)	3.55 (1.18)	4.00 (1.10)	0.288
3	3.50 (0.95)	3.11 (1.14)	2.64 (1.14)	3.38 (1.28)	0.043*
4	3.34 (0.79)	3.25 (1.00)	2.95 (0.90)	3.29 (1.15)	0.439
5	4.06 (0.76)	3.72 (0.74)	4.05 (1.09)	3.57 (1.25)	0.148

*Note: * indicates significance at the 0.05 level.*

Table 6.7: Items regarding importance of organisational support, levels of education

Item	Bachelor's (N = 25)	Master's (N = 35)	Professional/Doctoral (N = 33)	Other (N = 20)	p-value
1	4.12 (0.93)	4.69 (0.47)	4.20 (0.89)	4.41 (0.73)	0.025*
2	4.36 (0.81)	4.54 (0.61)	4.70 (0.47)	4.53 (0.64)	0.592
3	4.32 (0.75)	4.49 (0.66)	4.30 (0.73)	4.40 (0.69)	0.751
4	4.48 (0.65)	4.63 (0.55)	4.55 (0.51)	4.59 (0.58)	0.542
5	4.20 (0.71)	4.49 (0.61)	4.45 (0.69)	4.36 (0.66)	0.329

*Note: * indicates significance at the 0.05 level.*

Table 6.8: Items regarding importance of organisational support, years of experience

Item	1-2 (N = 32)	3-5 (N = 36)	6-9 (N = 22)	10+ (N = 21)	p-value
1	4.41 (0.56)	4.28 (0.78)	4.41 (0.96)	4.62 (0.59)	0.220
2	4.50 (0.57)	4.33 (0.72)	4.64 (0.66)	4.81 (0.51)	0.025*
3	4.41 (0.67)	4.19 (0.71)	4.59 (0.67)	4.57 (0.60)	0.079
4	4.62 (0.49)	4.42 (0.69)	4.64 (0.58)	4.81 (0.40)	0.136
5	4.28 (0.68)	4.25 (0.65)	4.41 (0.67)	4.62 (0.59)	0.152

Note: * indicates significance at the 0.05 level.